AMERICAN GAS ASSOCIATION MONTHLY

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Kitchen Planning Shows Progress

JESSIE McQUEEN

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National Directing Committee of Executives

AMERICAN GAS ASSOCIATION

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Regulation at Its Worst in Seattle Case

(From Western Gas—January, 1934)

VALUATION and rate proceedings in recent times have been conducted with little regard to precedent, logic or common equity. It is almost a foregone conclusion that company valuations will be rejected, former accepted rate bases will be slashed, and investigation will follow upon investigation with no thought to the costs involved. The regulatory mill must grind out its grist until utilities join the ranks of businesses operating below cost, until stockholders' returns vanish, until customers bear the ultimate cost in depreciated service.

One case among many is that of the Seattle Gas Company proceeding, in which regulation has run riot. A few of the details are worth reciting.

This case grew out of an ordinance adopted by the City of Seattle in May, 1932, whereby a special occupation tax of 3 per cent was levied on all gas, electric, water and other public service companies. Having insufficient revenues to permit of absorbing the tax the gas company applied to the Department of Public Works for permission to add it to customers' bills. After due hearings the Department of Public Works in an order dated January, 1933, gave the desired permission. This was the last order issued by the retiring Board of Public Works. An application for rehearing was immediately filed by the Public Utilities Committee of the Seattle City Council, and was granted by the newly appointed Department of Public Works of the Democratic Administration.

The Department ordered a complete investigation of Seattle Gas Company on its own motion concurrent with granting the rehearing to the City of Seattle, and proceeded to make a complete inventory and appraisal of the company's properties. This involved the employment of 22 engineers and accountants, who spent eight months on the work.

Under Washington statutes valuation and investigation matters carried on at the instance of the Department must be paid for by the utility under investigation. The company has not yet received the bill from the State for this investigation, but it is expected to fall between $25,000 and $30,000 for the investigators employed by the State. In addition it was necessary for the company to hire its own engineers and accountants to work with and check the work of the State engineers, and to prepare its case, bringing the total cost to the company somewhere in the neighborhood of $50,000, if the Department succeeds in collecting the bill.

Although the Seattle company's rates and valuation had been thoroughly reviewed in 1914 and in three or four subsequent hearings, and a very good historical cost value had been built up by inventory and appraisal and detailed audit of the books of predecessor companies, this Department held that the book costs shown on the company records were entirely unreliable and must be abandoned. A new historical cost valuation was arrived at by taking a physical inventory with which the company had very little quarrel; but by pricing it on totally inadequate unit costs the resulting figure was approximately $2,000,000 less than the actual cost of the physical properties to their original owners.

The Department also made a reproduction new valuation on the theory that the entire property could be reproduced in a two-year period using wholesale methods and buying all materials at wholesale prices with maximum discounts, laying all mains with ditch-digging machines in spite of insurmountable interference with cross services of sewers, water pipes, telephone connections, etc., except in the heart of the down-town business section, and arrived at a reproduction new valuation considerably less than the inadequate historical cost developed by its own studies. The next step was to discount this reproduction new valuation by deducting accrued depreciation on the basis of total estimated years of life compared with age of the property at the present time; this device reduced the rate base on the physical properties from an actual cost to the company of $12,800,000 to a depreciated reproduction new value of around $7,500,000. In aid of this reduction in value the Department also resorted to the device of calling several large standby units "non-operative."

From operating expenses all management fees paid to the holding company were eliminated, although it was conclusively shown that large benefits had accrued from management services rendered which would have to be paid for from some other source if not rendered by the holding company. All dues and donations were eliminated except those involved in a limited few trade organizations. Expenditures by the company for employee-welfare, such as annual picnic, Christmas party, etc., were eliminated. Likewise the fees paid to the trustees under the company's bond indentures.

And even on the above basis, after eliminating everything that could even remotely be questioned, they found the company was earning a fraction less than 8 per cent.

The Seattle case has been resubmitted, and decision is expected shortly. But whichever way the decision may swing it will not lessen the expense of the unnecessary investigation; nor will it replace customer confidence which is always dissipated in some measure by publicity attendant upon rate proceedings.

To some degree the present attitude of regulatory bodies toward their charges, the utilities, is a by-product of depression days. It may be hoped that here, too, returning prosperity will bring sane thinking; that rate proceedings will diminish in number, and that utilities may appear in them again with some assurance of a fair hearing.

AMERICAN GAS ASSOCIATION MONTHLY

Allyn B. Tunis, Editor

VOLUME XVI | FEBRUARY, 1934 | NUMBER 2

Manufactured Gas Industry Prepares To Present Code to NRA

DELEGATES representing a very large majority of the manufactured gas companies in the United States, in session in New York, January 19, organized their group and set up a Code Committee to present a "Code of Fair Competition for the Manufactured Gas Industry" to the National Recovery Administration.

In response to a resolution of the Executive Board, H. O. Caster, president of the American Gas Association, called the meeting of members of the industry, which took place at the Waldorf Astoria Hotel. Judge Caster's invitation was extended to all individuals, firms and corporations including both members and non-members of the Association and municipal and other government utilities which serve the public with manufactured or mixed gas. There were present 85 individuals each representing one or more gas companies.

Those present, together with proxies received by mail and wire, represented a total of 302 operating companies. These companies' revenues represent 83 per cent of the revenues of the entire manufactured gas industry.

Of the operating companies represented those that are members of the Association represented 81 per cent of the total industry's revenues.

By unanimous vote, those present constituted themselves as the "Manufactured Gas Industry Organization" adopted a constitution and, on motion of F. F. Schauer, vice-president and general manager of the Equitable Gas Co., Pittsburgh, Pa., elected the following officers:

Judge Caster, chairman, R. B. Brown, of Milwaukee, vice-chairman, and K. R. Boyes, of New York, secretary-treasurer.

Without a dissenting voice it was agreed that the Manufactured Gas Industry Organization should present a Code of Fair Competition to the National Recovery Administration under the provisions of the National Industrial Recovery Act. The following committee was elected to represent the industry in the preparation and presentation of a code:

P. H. Gadsden, Philadelphia Gas Works Co., Philadelphia, Pa.

W. C. Beckjord, vice-president and general manager, Boston Consolidated Gas Co., Boston, Mass.

Edward L. Davies, Long Island Lighting Co., Garden City, L. I., N. Y.

O. H. Fogg, vice-president, Consolidated Gas Company of New York, New York, N. Y.

N. Henry Gellert, president, Crisfield Gas Co., Crisfield, Md.

I. T. Haddock, Cambridge Gas Light Co., Cambridge, Mass.

R. C. Hoffman, Jr., president, Roanoke Gas Light Company, Roanoke, Va.

S. E. Linton, president, Nashville Gas & Heating Company, Nashville, Tenn.

W. G. Rudd, vice-president, The Peoples Gas Light and Coke Co., Chicago, Ill.

Herman Russell, president, Rochester Gas & Electric Corp., Rochester, N. Y.

Frank F. Schauer, vice-president and general manager, Equitable Gas Company, Pittsburgh, Pa.

Fred W. Seymour, Minneapolis Gas Light Co., Minneapolis, Minn.

M. L. Sperry, president, Washington Gas Light Co., Washington, D. C.

G. W. Stiles, vice-president, Portland Gas Light Company, Portland, Me.

James L. Stone, vice-president and general manager, Spokane Gas and Fuel Company, Spokane, Wash.

W. G. Woolfolk, president, Detroit City Gas Company, Detroit, Mich.

After explaining the tremendous amount of study and preliminary

work necessary in drafting a proposed code under the National Industrial Recovery Act, Judge Caster told those present that the American Gas Association, anticipating that a code might result, had had a committee at work upon a tentative draft. "This committee has been laboring for months in an effort to reconcile the differences of operating practices," Judge Caster said. "The task has been a difficult one, but we are happy that a draft is available for the consideration of this meeting. Copies were sent out to all manufactured and mixed gas utilities, both privately and municipally operated."

Mr. Gadsden, chairman of the newly elected committee and who served as chairman of the committee which drafted the preliminary Code, at Judge Caster's request reviewed the work already done and emphasized the major features it contained.

"This Code represents four months' hard work and study," explained Chairman Gadsden, "and fifteen or twenty drafts of it have been made. I must impress you with the fact that this Code, of necessity, is in a more or less formative stage." He stated that it had been painstakingly prepared at the expense of a great deal of time. "Certainly every paragraph and almost every word of this Code has been weighed and criticized before it was brought into the picture," he declared. He pointed out that everything possible had been done to further the best interest of the manufactured gas industry, and without any consideration whatsoever to legal or constitutional objections.

After Mr. Gadsden had drawn a clear picture of its contents, the Code was read and approved, subject to such changes or amendments as the Code Committee was authorized to make.

Before the Code is presented to the National Recovery Administrator, it will be considered by the Code Committee, and Mr. Gadsden invited all interested to submit suggestions for amendments. Before the committee presents the Code at Washington, a meeting will be held in New York to incorporate the final changes.

On motion of Robert H. Knowlton, vice-president of the Connecticut Light and Power Company, Hartford, Conn., a resolution was adopted to the effect "that membership in this group of the manufactured gas industry shall be open to all members of the industry and that any member of the industry not present may join this group and approve all action taken by this group by letter addressed to the Secretary of this group."

On motion of R. L. Fletcher, Providence Gas Company, Providence, R. I., the following resolution was adopted:

"RESOLVED, that this group, including such members of the industry as later join the group as above resolved, hereby assumes all expenses in connection with the formulation and presentation of this code or in any other way connected with the code and until such time as the code may become effective and such expenses shall be assessed and apportioned equitably among the members of this group as determined by the Code Committee appointed at this meeting."

A resolution offered by Clifford E. Paige, vice-president of The Brooklyn Union Gas Company, expressing the thanks and appreciation of the industry for the laborious and efficient work of the Code Committee, was unanimously adopted.

Munroe Award Arouses New Interest This Year

A. J. Gonnoud

UNDER the leadership of A. J. Gonnoud, president and general manager of the Kings County Lighting Company, Brooklyn, New York, as chairman, members of the Charles A. Munroe Award Committee this year are making an intensive effort to arouse enthusiasm and stimulate competition among A.G.A. member companies for the honor of having some employee within one of their organizations win the distinction of receiving this coveted prize.

The Charles A. Munroe Award is presented annually to the individual who is judged to have made the greatest contribution to the advancement of the gas industry within the year. Such contributions cover all parts of the gas business and, therefore, give each employee, no matter in what capacity he may work, a chance to capture this award, which consists of $500, together with an honorary distinction.

Mr. Gonnoud addressed 954 letters to A.G.A. members on January 13 and requested that employees in each company be notified of the opportunity before them to take part in this annual competition.

A new high in prompt returns was reached when, in answer to Mr. Gonnoud's letter, a letter dated January 15 was received from W. A. Tobias, vice-president of the Hagerstown Light and Heat Company, Hagerstown, Maryland. This letter informed Chairman Gonnoud that the employees of the Hagerstown Company had already received a personal letter from the management of that company urging them to avail themselves of the opportunity afforded by this annual distinction.

Several replies similar to that of Mr. Tobias have since been received by Mr. Gonnoud and demonstrate the evident interest among member companies in the Award. It is hoped that all member companies will acquaint their personnel with the possibility of someone in their own company winning the Charles A. Munroe Award for 1934, stressing the honor which is far in excess of any monetary value.

In judging contributions, the committee will consider the following three factors—originality and completeness, scope of usefulness and value of contribution. Presentation of the award will be made at the annual convention of the American Gas Association.

The other members of the Charles A. Munroe Award Committee are H. L. Dickerson, Electric Bond & Share Company, and Paul S. Clapp, Columbia Gas and Electric Corporation.

Huge Gas Field Reported In Southern Indiana

A HUGE reservoir, sixty miles long and twenty-five miles wide, containing sufficient natural gas to supply all of Southern Indiana, including Indianapolis, lies in the southwestern section of that State, according to a report by Dr. W. N. Logan, State geologist. The section is in Sullivan, Knox, Pike, Gibson, Dubois, Martin, Lawrence, Green, Monroe and Perry Counties. Gas Engineers also assert there is a potential undeveloped field in Switzerland County.

Based on engineers' estimates, the consumption of gas by all southern Indiana cities, including Evansville and Indianapolis, the two largest cities, would be approximately 7,720,000,000 cu.ft. annually. The Indianapolis consumption alone is estimated at 5,000,000,000 cu.ft. annually.

Domestic Gas Burner Design And Application

By R. M. Conner

Director, A. G. A. Testing Laboratory

SO many different theories have been advanced from time to time concerning the effect of gas burner design on appliance performance that it is felt a very useful purpose might be served by presenting a treatise on this subject. In fact, this topic has been considered of such importance that the A. G. A. Approval Requirements Committee recently requested the Association's Laboratory to prepare some material on it. Space forbids the coverage of both domestic and industrial burners in one paper. Accordingly, this first section will deal only with atmospheric burners ordinarily classified as being of the domestic type. Information on industrial types will follow later. No effort will be made either to dwell at length on the chemical aspects of this topic, as all of the various simple reactions involved have apparently been satisfactorily established by years of careful experimental work carried on by the most competent personnel of highly scientific organizations. Rather, it is desired to present a review of this subject from a semi-practical standpoint, with the hope that the material presented will be of value particularly to gas appliance manufacturers and in fact anyone interested in the application of burners to gas consuming equipment.

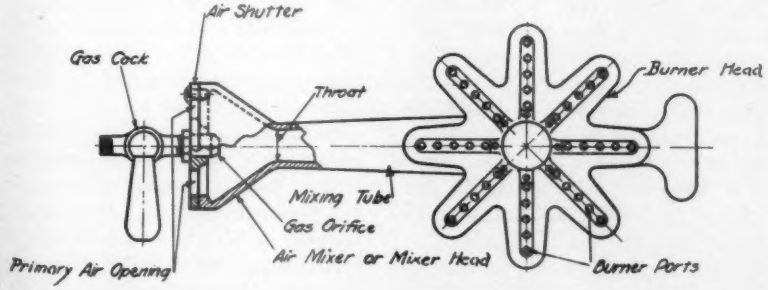
In the first place, many false theories exist regarding the influence of various burner designs on the overall efficiency of appliances. Barring certain special applications, any burner that will consume gas, irrespective of whether it is of the nonluminous or luminous flame type, assuming that the flames are supplied with a sufficient amount of air for complete combustion, will operate at 100 per cent efficiency. Accordingly, the theory that some burners are actually much more efficient than others is fundamentally wrong. Differences, if any, arise from the methods of application and not from differences in burner design. These facts probably will lead to the assumption that many of the extravagant claims made for various types of burners are ill-founded, and such is actually the case.

The American Gas Association has always been primarily interested in promoting the use of equipment that will operate with complete combustion. The principal reason, however, for this stand concerns the safety aspects involved rather than those affecting efficiency. It is not intended to imply that the efficient consumption of gas is not encouraged, for it most certainly is. The facts are, however, that even as much as 1 per cent carbon monoxide in the products of combustion reduces the efficiency of an appliance ordinarily only about 2 per cent, depending upon the type of appliance considered. Naturally, this class of performance, in ordinary domestic appliances at least, could not under any circumstances be tolerated.

Preceding comments logically lead to the main point of this discussion. If it is true that the type of burner employed is relatively unimportant in so far as efficient performance is concerned, what factors then actually determine the combustion characteristics of an appliance and what items actually establish its efficiency? These questions will be answered in later paragraphs. Before launching into a discussion of them, however, it is thought best to supply some fundamental data on the design of atmospheric gas burners.

In 1921, the U. S. Bureau of Standards, after several years of extensive research work, published Technologic Paper No. 193 entitled "Design of Atmospheric Gas Burners." This text is recommended for the careful consideration of all those interested in the fundamental principles of atmospheric gas burner design. Later work by this same organization resulted in the publication of Circular No. 394 entitled "Design of Gas Burners for Domestic Use," and Research Paper No. 446 entitled "A Method for Determining the Most Favorable Design of Gas Burners." All of these publications will be found very helpful to anyone interested in the general subject of gas burner design or application.

With the idea of correlating the information contained in the two previously mentioned bulletins and supplying additional material which has been obtained during recent years on this subject, the following data are supplied. For a study of standard terms, see Fig. 1.



ATMOSPHERIC STAR BURNER—DOMESTIC TYPE

Figure 1

The first consideration which arises during the design of any domestic gas burner involves the amount of port area that should be provided. This item, of course, will be established to a very large extent by the amount of gas (ordinarily computed in B.t.u.) that the burner is intended to consume. Although it is realized that service requirements, generally speaking, govern port location, and to a rather large extent, their size, there are a number of general rules affecting these specific items that can be advantageously followed. Naturally, the kind of gas consumed also has an important bearing on port size, although most manufacturers now design their burner equipment so that it will satisfactorily accommodate most any kind of city gas that may be encountered. Experience has proven that the very best results can be obtained by providing one square inch of port area for each 15,000 B.t.u. of natural gas consumed, and the same amount for every 25,000 B.t.u. of manufactured gas. An entirely satisfactory burner, however, can be designed on the basis of 20,000 B.t.u. per sq.in. of port area that will accommodate most any kind of city gas supplied, providing, of course, that the ports are correctly placed and sized and other considerations connected with satisfactory burner application are properly taken into account. Obviously, the quantity of gas to be burned (expressed in B.t.u.) will establish the total port area in square inches. Once this figure has been determined, the next step is to establish the proper port size. Most atmospheric burners will accommodate from 200 to 250 B.t.u. per port, the exact amount depending to a large extent upon the size of the port. Here again some manufacturers provide different size drillings for natural and manufactured gas, the former ranging probably from No. 28 to No. 34 drill size, and the latter from No. 34 to No. 44. A combination burner with No. 34 ports will, generally speaking, take care of most any city gas, and wherever possible it seems desirable that a combination burner should be employed; the reason being that the gas supply is often changed during the life of an appliance and for this reason it is quite desirable to have burner equipment provided possessing a maximum degree of flexibility.

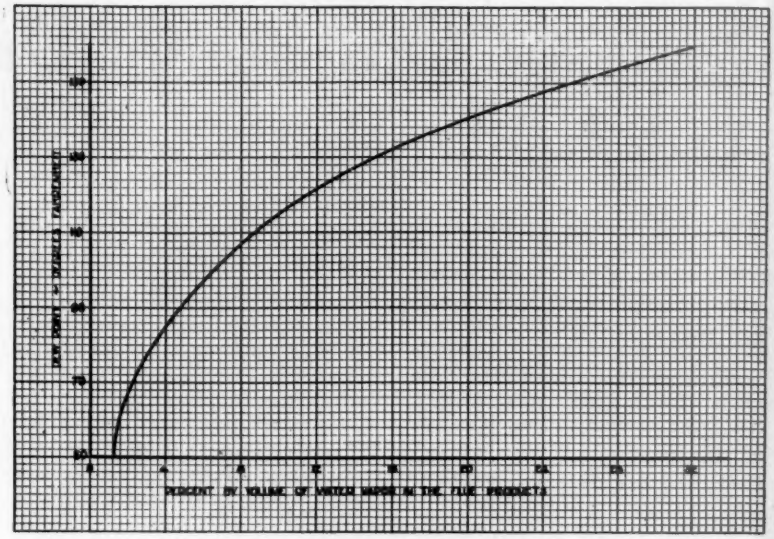


Figure 2
Relation of amount of water vapor in flue gases to the dew point

Raising the burner ports will usually prevent their becoming easily clogged and this practice also provides greater stability to the burner flames. Moreover, this type of construction ordinarily affords better access for secondary air and, consequently, improves combustion.

Such items as the depth of burner ports and the cross-sectional area shape, and volume of the burner head, likewise have an important bearing on the successful performance of any type of gas burner. This is particularly true of the latter two items. Most types of gas range and water heater burners are so flexible in their performance that the factor of port depth may sometimes be overlooked. This is not true, however, with many kinds of other burners. Generally speaking, the less the port depth the more susceptible a burner becomes to flash back. With any type of burner, of course, there is a lower limit below which one cannot go. Most cast iron burners are so designed and constructed that the port depth is seldom less than $\frac{1}{8}$ in. and wherever possible it will be found well to consider this as the lower limit. Greater depth ordinarily improves the performance of burners, although there is seldom any advantage to be gained by making ports greater than $\frac{3}{8}$ in. in depth.

Not only is sufficient burner head volume absolutely essential, but this storage space for the air-gas mixture must be of fairly uniform shape and properly spaced. There should be no abrupt bends or changes in the cross-sectional area of the burner head where they can possibly be avoided. If this condition exists, uneven lengths of the flame stools will appear and if such a construction is carried to extremes, flames on some of the ports may actually flash back, while on others they will appear entirely too long. Uneven flame height on any burner indicates improper distribution of the air-gas mixture storage space and such a condition should be corrected if uniform heating results are to be obtained.

Ordinarily it is inadvisable to employ more than two rows of ports on any burner unless, of course, a greater number can be spaced sufficiently far apart to afford ample access for secondary air to the inner rows. Lateral spacing of ports is also very important. Generally speaking, a good plan to follow is to make this distance a function of the port diameter. For enclosed burners the distance may be slightly greater than for types operating with ready access to unlimited quantities of secondary

air. A safe rule, however, to follow is to provide a lateral spacing of four port diameters from center to center. At least this distance should be maintained between adjacent and parallel rows and it is also advantageous from a combustion standpoint to stagger the drilling.

For ready reference a table has been supplied intended to show at a glance some important specifications affecting correct domestic gas burner design.

TABLE I

Essential Dimensions of Atmospheric Gas Burners

No.	Item	*Atmospheric Types*
1.	Capacity B.t.u./sq.in. port area	20,000
2.	Capacity B.t.u./sq.in. cross sectional area burner head	35,000
3.	Suggested port size M.T.D.	34
4.	Radius of mixer (arc-diam. in inches)	3
5.	Size of throat (per cent total port area)	40
6.	Slope of air mixing tube, degrees	2
7.	Length of mixing tube (times throat diam.)	6
8.	Cross-sectional area of mixing chamber (times area throat)	2½
9.	Port spacing center to center (times diam. port)	4
10.	Area of air mixer opening, times total port area	1½

Earlier in this paper it was brought out that the proper application of a gas burner was of paramount importance in assuring efficient and otherwise satisfactory performance. It was intimated that this consideration was even more important than the design or construction of the burner itself. It is still contended that this is a fact and it is now desired to expand on this theory. Assuming, for example, that this assumption is correct, just how is an engineer to go about determining whether or not the burner he is employing or any one which he may have under consideration, is the right one for the job?

Actually, there are hundreds of different factors that affect the successful performance of a gas burner. Many of these logically fall under the heading of practical considerations with which most gas appliance engineers are entirely familiar. There are two very important items falling under this general classification, however, which seem worthy of mention here.

First, ample combustion space must be provided between the horizontal plane containing the burner ports and the object or space directly heated, if complete combustion is desired. This distance may be somewhat difficult to determine exactly, although it is best practice to provide sufficient space so that the error, if any, will always occur on the safe side. Accordingly, it is best practice to provide some space between the object heated and the extreme tips of the burner flames when gas is being consumed at the maximum rated capacity of the burner. Second, if there is a surrounding combustion chamber and it is constructed of a material that will oxidize rapidly, always avoid direct impingement upon the walls; otherwise it is only a question of time until the surfaces thus contacted will fail.

Taking up now the more theoretical considerations affecting proper burner application and assuming that combustion is practically complete, we may conclude to begin with that

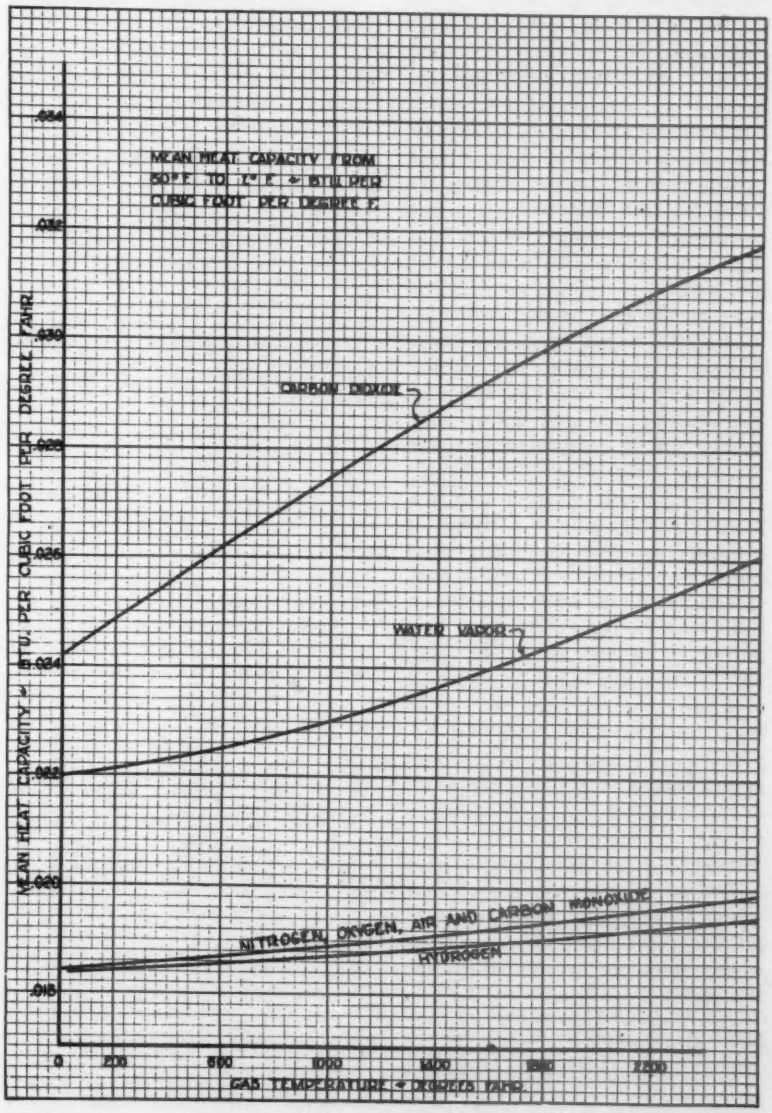


Figure 3
Mean heat capacity of gases found in flue products

all burners are approximately 100 per cent efficient. If one is not securing this over-all figure from the appliance, then factors other than the burner itself are at fault. Although it is generally possible to conduct efficiency tests and accurately determine the actual operating efficiency of any gas appliance, in deciding in a preliminary way upon the success of any burner application this practice is usually not necessary. Certainly it is not economical. Ordinarily a rapid determination of the flue losses will afford a sufficiently accurate index to permit the engineer to decide upon the merits of his burner application from an efficiency standpoint.

There are a number of different methods for computing flue losses, few of which are in exact agreement. The particular point of disagreement usually is in regard to the heat lost through water vapor formed during the combustion of any fuel gas. During the complete combustion of city gas, oxygen in the air combines in the combustion chamber with hydrogen and carbon of the gas, forming water vapor and carbon dioxide. These gases, accompanied by nitrogen from the air used during combustion and by some excess air, leave the combustion chamber of the appliance ordinarily at rather high temperatures. On passing over the heated surfaces these flue gases give up a certain amount of their heat and except in case of the water vapor, their temperature is reduced in direct proportion to the amount of heat given up. If the water vapor is condensed to a liquid, heat is recovered due to this change in state. The heat imparted during a change in temperature is known as "sensible heat" and that during a change from vapor to a liquid as "latent heat."

It should not be supposed that condensation of all the water vapor occurs at any given temperature of the flue gases. The temperature at which condensation will take place depends upon the proportion of water vapor in the flue gases, as shown by Fig. 2, and consequently, as the water vapor is condensed the condensation temperature is correspondingly lowered. The amount of heat given up during condensation of water vapor varies, with the temperature being higher with the lower temperature and the specific heat of water is higher in the liquid state than in the vapor. Applying these theories to flue loss determinations, it will be noted that the results are likely to depend on the temperature at which one considers the change from liquid to vapor state to take place.*

To assist those interested in determining flue losses with reasonable accuracy, the following example has been supplied:

Taking the following representative flue gas analysis and temperatures

CO_2	8.8%
O_2	4.1%
N_2	87.1%

Flue temperature, degrees Fahrenheit—350
Room temperature, degrees Fahrenheit— 60

Assume the following analysis of a city gas, and compute its oxygen requirements and theoretical combustion products as follows:

Fuel Gas Analysis		*Oxygen Required*	*Combustion Gases—Cu.Ft.*		
Component	*Amount*		CO_2	H_2O	N_2
CO_2	.020	—	.020	—	—
C_2H_4	.028	.084	.056	.056	.317
C_6H_6	.010	.075	.060	.030	.283
O_2	.002	—.002	—	—	—.008
H_2	.536	.268	—	.536	1.012
CO	.060	.030	.060	—	.113
CH_4	.300	.600	.300	.600	2.268
C_2H_6	.000	—	—	—	—
N_2	.044	—	—	—	.044
Total	1.000	1.055	0.496	1.222	4.029

Total volume of theoretical dry products $(CO_2 + N_2) = 0.496 + 4.029 = 4.525$

Ultimate $CO_2 = \frac{0.496}{4.525} \times 100 = 10.96\%$

The flue gas analysis shows that excess air constitutes:

$100 - \left(\frac{8.8 \times 100}{10.96}\right) = 19.8\%$ of the dry gases or

$\frac{19.8 \times 4.525}{(100.0 - 19.8)} = 1.116$ cu.ft. per cu.ft. of gas burned.

To determine the heat loss from any of the dry gases multiply its volume by its specific heat and temperature rise $(350° - 60° = 290°)$. For the determination of specific heat values, Fig. 3 is supplied. The heat carried away by the dry gases is as follows:

$CO_2 = 0.496 \times 290 \times 0.02517 =$	3.62 B.t.u.
$N_2 = 4.029 \times 290 \times 0.01855 =$	21.67 B.t.u.
Air $= 1.116 \times 290 \times 0.01855 =$	6.01 B.t.u.
	31.30

Having obtained the heat losses in the dry gases, a method of computing water vapor losses will next be considered. Water is considered as liquid below the dew point, and as a vapor above. The dew point is determined by the law of partial pressures for an atmospheric pressure of 14.7 lbs. per sq.in., i.e.;

$$\text{Vapor tension} = \frac{14.7 \times 1.222}{(4.525 + 1.116 + 1.222)} = 2.62 \text{ lbs. per sq.in.}$$

Corresponding to a dew point of 136.2° F.
Latent heat of water vapor at 136.2° = 1015 B.t.u. per pound

Sensible heat, vapor;	$1.222 \times 0.0222 \times (350 - 136.2) =$	5.80 B.t.u.
Sensible heat, liquid;	1.222×0.04758† $\times (136.2 - 60) =$	4.43 B.t.u.
Latent heat;	$1.222 \times 0.04758 \times 1015$	= 59.05 B.t.u.
Total		69.28 B.t.u.

The data necessary to determine the flue loss from any appliance by the above method is as follows:

1. Amount of fuel gas being burned per unit of time.
2. Per cent CO_2 in the flue products.
3. Flue gas temperature.
4. Room temperature.
5. Heating value of gas used.
6. Analysis of fuel gas used.
7. Ultimate CO_2 of gas used.

It is necessary to perform the following computational steps:

1. Compute the temperature rise above room temperature of the flue products. Flue temperature — room temperature = temperature rise.
2. Compute the cu.ft. of excess air/cu.ft. of gas burned as follows:

$\frac{\%\ CO_2 \text{ in flue gas} \times 100}{\text{Ultimate } \%\ CO_2} =$ % of flue gases which are theoretical products

* The presence of sulfur dioxide and sulfur trioxide in flue gases from manufactured and mixed gases especially will raise the theoretical dew point to temperatures considerably above the values indicated on Figure 2. Maconachie in "The Deterioration of Domestic Chimneys" discusses this point at some length and gives actual data.

† Weight of 1 cu.ft. of water vapor at 60° F. and 30" Hg.

100% — % of flue gases which are theoretical products = % excess air (going out flue with products of combustion).

Cu.ft. excess air/cu.ft. fuel gas burned =

$$\frac{\%\text{ excess air} \times \text{total theoretical dry products}}{\%\text{ of flue gases which are theoretical products}}$$

(See analysis of fuel gas for total dry products)

By referring to the analysis of the fuel gas, the cu.ft. of products (CO_2, N_2, and H_2O) per cu.ft. of fuel gas may be determined.

3. By referring to Fig. 3, determine for the flue gas temperature, the mean specific heats of the CO_2, N_2, Air and H_2O.
4. Compute the sensible heat content of each of the dry flue gases by multiplying the quantity of gas (as determined in item 2) by the mean specific heat (as determined in item 3), and by the temperature rise (as determined in item 1).
5. Compute the sensible heat of the water vapor by multiplying the quantity of water vapor (as determined in item 2) by the mean specific heat, and by the temperature rise (flue gas temperature—condensation temperature).
6. Compute the sensible heat of the liquid by multiplying the quantity of water vapor (as determined in item 2) by the weight of a cubic foot of water vapor at 60° F. and 30" Hg, and by the temperature rise (condensation temperature—room temperature).
7. Compute the latent heat of the water vapor by multiplying the quantity of water vapor (as determined in item 2) by the weight of water vapor at 60° F. and 30" Hg (0.04758 lbs. per cubic foot) and by the latent heat of vaporization at the temperature of condensation.
8. The flue loss is then the sum of the B.t.u. from the dry gases, the sensible heat of the water vapor, the latent heat of the water vapor, and the sensible heat of the liquid.

The following precautions should be taken in flue loss determinations:

1. For very accurate work, the analysis for CO_2 may be conducted with an apparatus of the modified Haldane type, which is sensitive to 0.01%. For ordinary purposes, an Orsat apparatus with a buret calibrated to 0.2% is sufficiently accurate. The error in the flue loss calculation for a typical gas due to an error of 0.2% in finding the percentage of CO_2 will not introduce serious errors in the final result.
2. It is also imperative that accurate measurements be made when recording flue gas temperatures. If a mercury thermometer is used it should be calibrated by comparison with a standard thermometer. When the flue gas temperature is taken by suspending the thermometer in the center of the flue pipe, a thermometer that has been calibrated for total immersion should be used. Likewise, in those situations where a draft hood or other obstruction prevents the thermometer being suspended in the pipe and necessitates its being inserted through an opening in the side of the pipe, use a thermometer which is calibrated for a 3-inch immersion.

For precise work a velocity thermocouple equipped with a radiation shield would be necessary, but thermometers, if they are properly calibrated, are sufficiently accurate for routine flue loss tests.

A thermometer reading may be in a hot spot or a cold spot, and a number of readings in zones of equal areas should be taken to establish an average figure. Although a velocity thermocouple is the most accurate instrument for these purposes, there is not a great amount of radiation at the temperatures found in ordinary gas appliances and thermocouples made of small gage wire are not materially affected by it.

Having discussed some of the practical aspects of domestic gas burner design and outlined an accurate and fairly simple method for determining flue losses, information is now available in one article that should assist engineers interested in making a preliminary analysis of any gas burner application. It is hoped that the material which has been supplied will be utilized to such an extent that the construction of all unsatisfactory types of appliances will not take place or at most never proceed beyond the experimental stage.

Southern and Southwestern Sales Councils To Meet

A JOINT conference of the Southern Regional Gas Sales Council and Southwestern Regional Gas Sales Council will take place at the Peabody Hotel, Memphis, Tenn., March 21-23, according to arrangements already completed.

This joint session is expected to prove unusually attractive because the time and place were chosen to coincide with those of the annual convention of the Southern Gas Association.

Sessions of the joint sales conference will be held in the afternoons, while the business meetings of the Southern Gas Association will be held in the morning.

Prominent speakers have been invited to present a program which is expected to have a wide appeal, especially to representatives of sales departments.

Among the topics to be discussed will be: "Today's Industrial Gas Developments," "Sales Planning for Better Times," "Promoting Gas Refrigeration through Utilities and Dealers," "Operating Sales Departments on a Load Building Basis Rather Than on an Appliance Merchandising Basis," "Developing Appreciation and Sales of Automatic Hot Water Service," "Modernizing Our Service to Commercial Customers," "Playlet on Kitchen Modernization," "Importance of Promoting Kitchen Planning Service," and "Space Heating Possibilities."

Will Study Short-Cuts To Fix Steel's Load Ability

ANNOUNCEMENT has been made by the Joint Committee of the American Society for Testing Materials and the American Society of Mechanical Engineers on the Effect of Temperature on the Properties of Metals that it is considering a three-year research program to determine the extent to which structural steel formulae will hold when the structures are subjected to high temperatures in such industries as the gas, power, oil and industrial furnace. This proposed work will take the nature of intensive creep tests extending over the entire three-year period. Concurrent with these creep tests so-called short-cut formulae will be investigated and tests to determine their accuracy will be conducted on identical specimens as those being used in the long time tests.

Industrial gas furnace and plant apparatus users, as well as manufacturers within the gas industry, who might be interested in any phase of this work, are invited to communicate with the secretary of the Joint Committee, N. L. Mochel, Westinghouse Electric Manufacturing Company, Lester Station, Philadelphia, Pa.

Development of Heating, Annealing And Other Heat Treating Processes In Controlled Atmospheres*

By R. J. Cowan

Metallurgist, Surface Combustion Corporation

IN the development of the improved heat treating machines necessary for the production of improved parts under more exacting conditions and at lower costs, one most important phase has been the study of the effect of furnace atmospheres on hot metals. These effects are quite independent of the source of heat, and the principles outlined below may be applied very broadly, although they have been studied as a part of a program for making gas available for these improved heat treating processes.

There are many applications where a controlled flue gas atmosphere surrounding the work will meet the requirements. Many other cases require a special atmosphere not consistent with direct combustion—a muffle must then be used to confine these atmospheres. We therefore have two broad divisions to consider—(a) heating in controlled flue gases and (b) heating in a special atmosphere contained in a muffle.

Controlled Flue Gases

Plain and alloy steel, copper, some of the low brasses, nickel, aluminum bronzes, and many of the rarer metals may be annealed in the controlled products of gaseous combustion and an effect produced that meets the usual industrial requirements. (It should be made clear at the beginning that the term "bright anneal" has so many meanings that it is readily misunderstood. "Bright anneal" may vary all the way from a result a little better than could have been obtained in an uncontrolled atmosphere, to a virgin metal surface of great brilliancy. On account of this flexibility of language it is better to deal specifically with particular cases and effects.)

In the heat treatment of steel in direct-fired furnaces there are two fundamental actions—scaling and decarburization—both increasing in importance as the temperature goes up. To determine the facts about different atmospheres commonly found in gas-fired furnaces, the American Gas Association, through its Committee on Industrial Gas Research, has carried on at the University of Michigan an exhaustive series of studies. The work has been done by W. E. Jominy and associates, and results published as Bulletins by the University and as contributions to Transactions, American Society for Metals, where they should be studied by all who are interested. The mass of data is far too great to be summarized in brief space.

One of the most difficult problems has been the preventing of scale on metal heated to the high temperatures for forging. The common opinion has been that a highly reducing atmosphere is best (that is to say, one containing large amounts of carbon monoxide). Jominy has investigated this matter in detail for the Research Committee and has outlined the procedure to be followed for best results. The Surface Combustion Corp., proceeding on different lines, has developed a particular type of gas burner that produces strata of air and gas, traveling parallel to each other throughout the furnace chamber without turbulence. Combustion occurs only at the surfaces where the gas and air are diffusing into each other, and grades from a perfect combustion mixture on down to conditions correct for breaking down the hydrocarbons into free carbon. This process of "diffusion combustion" was described in METAL PROGRESS for September, 1932.

In many instances it has been difficult to establish a clear distinction between "luminous combus-

Mr. Cowan is one of the metallurgists who has been actively engaged in carrying on the metallurgical research and development program of the Committee on Industrial Gas Research. This program has been instrumental in rallying the gas industry to the use of controlled atmosphere furnaces as a necessary medium of making gas play a more important part in today's industrial heating operations. He is well known in metallurgical circles and has presented technical papers before large groups in various industries.

In this discussion he points out how scaling and decarburization are two bad effects of open furnace heating which can be avoided by incorporating controlled atmospheres. Proper gas blankets will hold steel scale-free even at the high temperatures required for forging. Pioneer work in which he has played an important part has shown how oxidation and tarnishing of brass, copper and steel during the annealing process may be entirely prevented by special atmospheres.

Among the bulletins of the Research Committee which he mentions are: "Influence of Atmosphere and Temperature on the Behavior of Steel in Forging Furnaces"; "Surface Decarburization of Steel at Heat Treating Temperatures"; "Scaling of Steel at Heat-Treating Temperatures"; "The Malleabilization of White Cast Iron"; and "Baking Practices for Oil Sand Cores." Copies of these bulletins may be secured from Association Headquarters.

* Digest of paper published in the January, 1934, issue of "Metal Progress."

tion" and "diffusion combustion," because diffusion combustion of certain gases is also highly luminous. In forging, for example, luminous combustion cannot produce scale-free forgings, whereas diffusion combustion can heat steel to forging temperatures without the formation of any scale whatever.

In the past year several noteworthy installations have been made which probably can best interpret the latter process. A valuable characteristic has been utilized, in connection with forge heating, to blanket the work with a stream of raw gas which completely prevents oxidation of polished steel even when heated as high as 2400° F. This gas blanket is maintained unbroken throughout the length of the furnace because of the non-turbulent or laminar flow from the burner.

A modification of this system of combustion has been used for introducing free carbon into the furnace atmosphere. This is valuable particularly in the case of sheets where it has been customary to use a charcoal dip to prevent sticking during rolling. When free carbon is injected into the furnace atmosphere the sheets do not stick together and surface conditions are good, even where a certain amount of air leaks through a poorly constructed furnace wall. In other words, free carbon in a furnace atmosphere offsets air infiltration which otherwise would have caused severe scaling in a non-luminous variety of furnace.

It has been possible in other cases (for example, on a car bottom annealing furnace) to offset a decarburizing effect by injecting a certain amount of free carbon. A wire normalizing furnace, where the wire is heated in coils to temperatures around 1900° F., meets the extremely difficult conditions of preventing detrimental scale on the outer strands of the coils and controlling the decarburization.

The importance and value of this control of free carbon in furnace atmosphere when handling steel at elevated temperatures cannot be overemphasized.

Jominy has also investigated very thoroughly the process of decarburization in gaseous atmospheres. In this instance also it was a surprise to find that hydrogen and carbon dioxide were so strongly decarburizing in their action, but it was a relief to know that these effects could be prevented by the presence of proper amounts of hydrocarbon and carbon monoxide gas. It is noteworthy that scale has an effect upon decarburization—usually of preventing it.

Yellow brass, at annealing temperatures, exudes gases which oxidize zinc. Bright annealing in continuous belt-type muffle furnace requires a special atmosphere containing methanol vapor, which stops this action. (Surface Combustion Corporation)

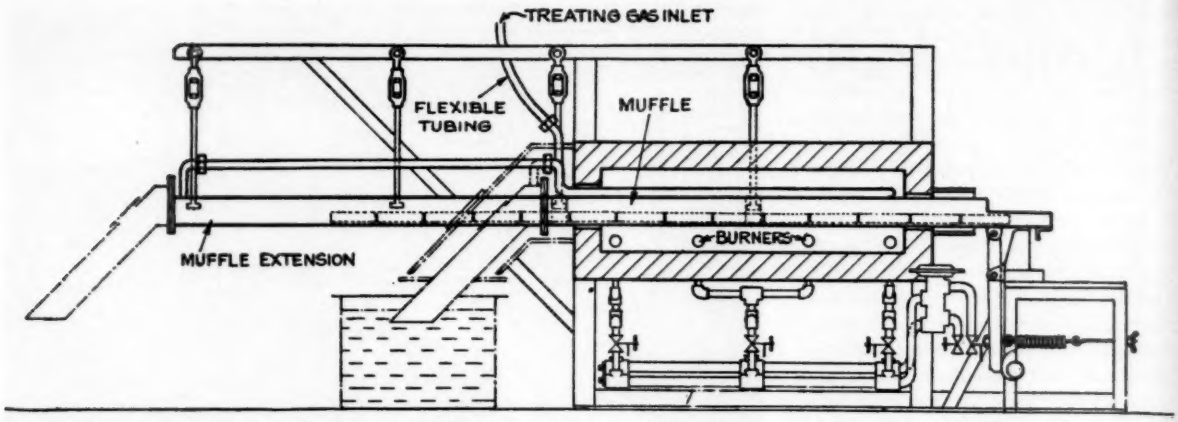
There have been conducted in the Surface Combustion Corp. laboratories, over a period of years, a large number of studies as to the effect of specific atmospheres upon specific metals under different conditions. These have resulted in the development of a number of different processes for specific applications, using all the common industrial gases. It has been an interesting fact that the details of the application have often been of as great importance as the atmosphere itself and have demanded as careful a study as the mere chemical effects of the atmosphere itself on the metal under consideration. Under these circumstances it is obviously better to consider practical cases than to discuss generalities.

Many of the reactions involved are of a very specific nature that have to be conducted carefully to make them operative. For instance, when this work is done in a metal muffle, as it frequently has to be, the particular alloy used for the muffle or trays will have a very decided effect upon the reaction taking place. There are certain instances where a particular alloy is necessary to catalyze the desired reaction, whereas, in other instances, if the muffle is at all catalytic, the reaction takes place only on the walls of the muffle rather than upon the surface of metal to be heat treated! Such effects are baffling until the mechanism of the reactions is understood. By this means, hydrogen either from hydrocarbon or cracked ammonia may be catalyzed to produce unusual effects; also various organic compounds under the influence of an anti-catalyst may be so used.

The difficulty of heat treating copper-zinc alloys, usually included in the generic term "brass," is not great at low temperatures, but, as the temperature is increased to desired annealing temperatures and where zinc begins to volatilize from the surface, the difficulties are multiplied. Volatilization of zinc seems to be coincident with the liberation of occluded gases which oxidize the metal to a scale consisting either of zinc oxide or a mixture of oxides. The general problem was discussed by de Coriolis and Cowan in Journal of Industrial and Engineering Chemistry for 1929, page 1164.

Annealing of Brass

The usual method of approach to this problem has been to employ various atmospheres that are commonly considered neutral or reducing in their action. In gas-fired furnace technic the attempt has been made to use a



A newly developed continuous gas heated machine for heat treating metals in controlled gas atmospheres. (American Gas Furnace Company)

flue gas purified of water vapor and carbon dioxide (since both of these are highly oxidizing to heated brass) to a residue of nitrogen containing small amounts of carbon monoxide. Such a gas has not succeeded in producing a bright-annealed brass, owing primarily to the oxidizing gases liberated from the metal itself.

In a contribution on this subject by the present author before the Industrial Section of the American Gas Association in Philadelphia, 1931, experimental evidence was presented to show that neither pure nitrogen nor pure carbon monoxide will prevent the staining and scaling of brass during the annealing process. The author was also able to prove that relatively small amounts of methanol vapor, even when added to atmospheres that were highly oxidizing to brass, acted as an inhibitor by some unknown mechanism and completely prevented the formation of oxide films.

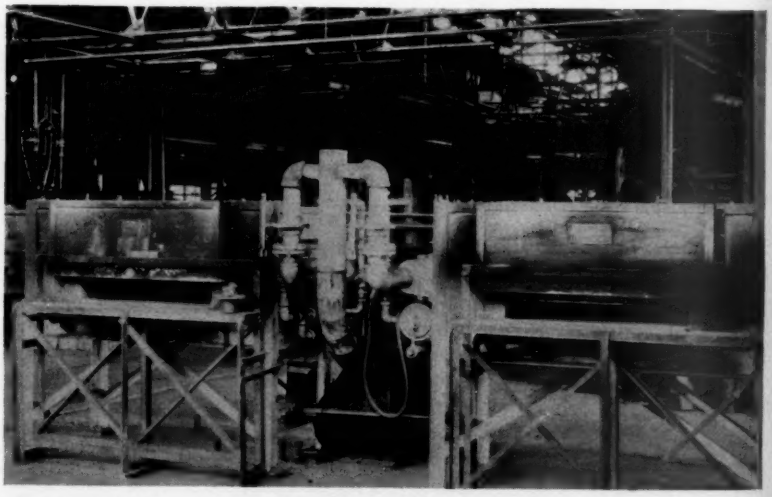
In continuing the experimental investigation of these phenomena, it has been found that under proper conditions the bright annealing of metals, and particularly of brasses, can be accomplished in an atmosphere of hydrocarbon gases or any gas which will liberate hydrogen, or, in fact, hydrogen itself under properly controlled conditions.

When the heat treating operation is conducted in a muffle, the results are extremely interesting and valuable, especially where the operation can be made continuous as in the new furnaces. When work enters at one end and discharges at the opposite end of an elongated muffle, a number of different reactions can be induced in successive zones, thus producing work of a uniformity and quality that can be obtained in no other way. This is due not only to the fact that the metal is subjected to successive temperature zones so that the work must receive identical heat treatment in passing through these zones, but also to the fact that temperature has a very great effect upon the reactions between metal surfaces and surrounding atmospheres. This brings about, in the different temperature zones, a desirable succession of chemical reactions.

For instance, in the heat treatment of certain non-ferrous metals, an atmosphere may be found to be oxidizing in those temperature zones wherein the metal is approaching the full annealing temperature, and when this temperature has been reached, the oxide thus formed becomes a very active catalytic agent activating the atmosphere to a strong chemical effect upon the metal surface that has a very energetic cleaning action.

The same idea is illustrated by the further application of the general principles to other metal heat treating processes such as nitriding and carburizing of steel. These principles have been successfully applied to these and other intricate processes by the development of both batch type and continuous gas furnaces.

The details of continuous processes for carburizing in controlled gas atmospheres were worked out in the laboratory by extensive experimenta-



Diffusion combustion burners and a blanket of raw gas to immerse the work will heat steel to forging temperatures free of scale. (Surface Combustion Corporation)

tion, and a number of industrial installations have been made that are producing work of a very high quality and character.

For a detailed description of one such, the reader is referred to *Metal Progress,* February, 1932. The essential carburizing reactions are conducted in a series of successive reaction zones, and each piece to be carburized is made to pass through these zones in regular order. For this reason, each piece receives identical heat treatment in a succession of identical atmospheres that are under definite metallurgical control. Different carburizing effects may be obtained by varying the proportions of gases used in this operation. This makes it possible to produce either a hypo-eutectoid, a eutectoid, or a hyper-eutectoid case.

The regulation of this process is obtained simply by adjusting a couple of valves so as to maintain a flow of gas of uniform characteristics. This flow is then maintained automatically so that no further attention is required other than that necessary to charge and discharge the furnace.

This process has found acceptance in the art and is successfully carburizing many parts that have been difficult to handle in the past. For instance, the automobile free wheeling unit, commonly referred to as a "pineapple" because of its shape, is being handled successfully with excellent results; the steel is a 3½% nickel-molybdenum steel, known to be a slow carburizer. Ring gears of S. A. E. 4615 steel are also being carburized in a furnace of this kind and directly quenched in a fixture. Camshafts are being carburized with excellent results. There has been in operation for over 24 months a furnace hardening steering gear parts; this operation has been highly successful and a very uniform product is being produced.

Specific Studies Required

These applications are the best illustrations that can be offered of the possibilities embraced in the use of a proper gas atmosphere for carrying on the different processes involved in the metallurgical art. Improvements are bound to continue and these improvements will revolve around the vast field of possibilities afforded by the intelligent application of correct atmospheres to particular problems.

It is necessary to sound a warning against all broad general claims as to these possibilities. The problems, for the most part, are specific problems that have to be met in a specific way, after a painstaking and thorough study of the fundamentals involved, and a correct engineering analysis to embrace these fundamentals in an industrial process that will fit the needs of shop operation. Thus the ideal of scientific heat-treating operation without scientific supervision may be achieved. Only by this means will it be possible for the heat treating department to keep pace with the needs of industry and turn out a product of which all may be proud.

Southwestern Gas Measurement Course Will Take Place in April

THE general committee in charge of the Southwestern Gas Measurement Short Course, held annually at the University of Oklahoma, selected April 24, 25 and 26 as the dates for the 1934 course. This is a project of the College of Engineering of the University of Oklahoma, of which J. H. Felgar is dean, and the school is held each year in the engineering building on the university campus at Norman, Okla.

Gas measuring equipment is installed for exhibition and demonstration by the leading manufacturers, and factory and sales representatives are on hand to demonstrate it. These and university professors of mechanical engineering are the instructors of this school, under direction of Professor W. H. Carson. Attendance embraces employees of gas and oil and gasoline manufacturing companies which are concerned with the subject of measurement of either dry or casinghead gas. The purpose of the school is to increase the accuracy of measurement and the efficiency of regulation to the end that the public may be better served, the dealings between buyer and seller put on a more accurate and equitable basis, and that correct information regarding the engineering and practical problems involved be disseminated among the men in the industry.

The chairman of the General Committee in charge of the 1934 course is W. R. McLaughlin, of the Arkansas Natural Gas Corporation, Shreveport, La. R. D. Turner, of the Skelly Oil Company, Tulsa, Okla., will be in charge of exhibits this year, and D. C. Williams, of the Kay County Gas Company, Ponca City, Okla., is chairman of the Program Committee.

This project was established in 1924 and has had a registration in some years exceeding 400. On account of economic conditions this project was omitted in 1933.

Seven prizes are awarded each year for papers written on the topic "What I Learned at the Meter School." The winners of the prize papers, submitted after the last course, were:

First prize, $15—B. K. Golson, Lone Star Gas Co., Dallas, Texas; Second prize, $10—E. C. McAninch, Oklahoma Natural Gas Corp., Tulsa, Okla.; Five $5 prizes—Conrad A. Franks, Gasoline Department, Amerada Petroleum Corp., Tulsa, Okla.; Geo. Murray, Ponca City Gas Distributing Co., Ponca City, Okla.; Lee Overstreet, Kansas-Osage Gas Co., Ponca City, Okla.; J. B. Faust, Lone Star Gas Co., Dallas, Texas; Ralph McNutt, Oklahoma Natural Gas Corp., Tulsa, Okla.

General Committee in charge of Southwestern Gas Measurement Short Course. Back row, left to right: J. H. Felgar, Dean, College of Engineering, University of Oklahoma; Gilbert Estill, Oklahoma Natural Gas Co., Tulsa, Okla.; R. D. Turner, Skelly Oil Co., Tulsa; D. C. Williams, Kay County Gas Co., Ponca City, Okla.; E. E. Stovall, Lone Star Gas Co., Dallas, Texas

Front row, left to right: B. L. Maulsby, Oklahoma Natural Gas Co., Tulsa; W. R. McLaughlin, Arkansas Natural Gas Corp., Shreveport, La.; W. H. Carson, Director, School of Natural Gas Engineering, University of Oklahoma; E. F. McKay, Oklahoma Utilities Association, Oklahoma City; A. J. Kerr, Midwest Equitable Meter Co., Tulsa; J. J. Hassler, Corporation Commission, State Capitol, Oklahoma City

Affiliated Association Activities

Oklahoma Utilities Association

THE sixteenth annual convention of the Oklahoma Utilities Association will be held at Tulsa, March 6 and 7, with headquarters at the Mayo Hotel. The program in preparation will be constructed along the plan followed by this association during the past two years which gives the convention a strictly practical character. The Executive Committee feels that it is necessary to "take stock" of the situation in the Oklahoma utility industry each year and that this need justifies the convention.

The association includes gas, electric, electric railway, telephone and manufacturers divisions. The two-day program this year will consist of general sessions including all divisions except for separate division sessions one half-day. The convention dinner will be held the first evening, probably followed by a reception and dance.

Program speakers will include leading representatives of the several branches of the industry.

Present officers of the association are R. J. Benzel, Telephone Division, president; H. B. Cobban, Electric Railway Division, first vice-president; W. B. Head, Jr., Electric Light and Power Division, second vice-president; W. R. Emerson, treasurer and E. F. McKay, manager.

Convention Calendar

February

5- 8 American Society Heating & Ventilating Engineers
New York, N. Y.

8- 9 Eastern Natural Gas Regional Sales Conference
William Penn Hotel, Pittsburgh, Pa.

8- 9 New England Gas Association Convention
Boston, Mass.

15-16 Mid-West Regional Gas Sales Conference
Hotel Stevens, Chicago, Ill.

27-28 & March 1 Joint Gas Conference
Birmingham, England

March

6- 7 Oklahoma Utilities Association
Tulsa, Okla.

23 New Jersey Gas Association
Trenton, N. J.

21-23 Southern Gas Association and Southwestern Regional Sales Conference
Peabody Hotel, Memphis, Tenn.

25-30 American Chemical Society
St. Petersburg, Fla.

April

9-10 A. G. A. Distribution Conference
Book Cadillac Hotel, Detroit, Mich.

16-17-18 Mid-West Gas Association
Sioux City, Iowa

19-20 Missouri Association of Public Utilities
The Elms Hotel, Excelsior Springs, Mo.

May

1- 4 U. S. Chamber of Commerce
Washington, D. C.

9-10 Pennsylvania Gas Association
Wernersville, Pa.

14-18 National Fire Protection Association
Haddon Hall, Atlantic City, N. J.

15-17 Natural Gasoline Association
Tulsa, Okla.

24 National Board of Fire Underwriters
New York, N. Y.

June

4- 5 Canadian Gas Association
Montreal, Canada

18-21 National Association of Purchasing Agents
Cleveland, Ohio

25-29 American Institute Electrical Engineers
Hot Springs, Va.

September

1- 4 International Gas Association
Zurich, Switzerland

9 American Trade Association Executives
Wernersville, Pa.

October

Wk. 29 American Gas Association Convention and Exhibition
Atlantic City, N. J.

New England Gas Association

ADDRESSES by officers of the American Gas Association will feature the opening session of the New England Gas Association's annual convention, which will take place at the Hotel Statler, Boston, February 8 and 9. H. O. Caster, president, will deliver an address on "The Gas Industry Today," while Alexander Forward, managing director, will discuss "The American Gas Association Today."

Another event at the initial meeting will be the presentation of "Sales Contest and Division Paper Awards," which will be made by F. L. Ball, vice-president of Charles H. Tenney & Co.

Activities of the New England association will be reviewed H. R. Sterrett, president, and Clark Belden, executive secretary.

At the second business meeting, the members will discuss problems confronting the industry, starting with a paper on "Distribution Economics under Changing Conditions," by E. H. Eacker, of the Boston Consolidated Gas Company. The problems of the small company will be handled by John A. Weiser, vice-president of the Newport Gas Light Co., in an address by that title. Mr. Weiser will be followed on the program by a paper on "Kitchen Heating Developments," by J. L. Johnson, of the Providence Gas Company.

The accountants will be represented by Francis J. Brett of the Niagara-Hudson Power Company, who will speak on "The Bookkeeper of Today." The Thursday session will close with a discussion of merchandising principles by R. H. Knowlton of the Connecticut Light & Power Company, whose subject will be "A Set of Merchandising Principles."

"Commercial Competition" is the subject of an address to be made by Roy E. Wright, commercial and house heating engineer of the New England Gas & Electric Association, at the Friday morning session. This subject will be further developed from a different angle by the next speaker, L. B. Crossman, of the Boston Consolidated Gas Company, in an address on "Fair Competition in Selling Commercial Equipment."

Air conditioning will have a prominent place on the program, there being two speakers assigned to that topic. James Patterson, of Silica Gel Company, will discuss the engineering aspects of air conditioning, and Lyle C. Harvey, of Bryant Heater Company, will cover its sales possibilities. Another subject included in this session will be "Architect Co-operation and Kitchen Planning," by R. J. Rutherford, of the New England Association. The morning session will be concluded by Roger A. Gordon, of the Pawtucket Gas Co., Blackstone Valley Gas & Elec. Co., who will speak on "Reçovering Domestic Gas Meters."

The program of the final session has not been completed, but it is planned to have three speakers, one of whom has already been selected. Richard T. Higgins, president of the Editorial Association of Railroad and Utilities Commissioners, and chairman of the Connecticut Public Utilities Commission, will speak on a subject of general importance.

There will be a dinner of the Home Service group, Thursday evening, February 8, at which several short talks will be given under the title of "Pertinent Home Service Suggestions." It is expected that President Sterrett and Chairman Hall of the Sales Division will extend greetings to this group. It also has been announced that there will probably be a luncheon on Thursday for the wives of members.

New Jersey Gas Association

THE twenty-third annual convention of the New Jersey Gas Association will take place March 23, 1934, at the Stacy-Trent Hotel, Trenton, New Jersey. The one-day meeting will be called to order at 10 A.M. by F. A. Lydecker, of Public Service Electric and Gas Company, who is president of the Association.

Following a brief business meeting, during which reports of operating committees

will be presented, and officers for the next association year will be elected, Alexander Forward, managing director of the American Gas Association, will introduce Judge Herbert O. Caster, president of the latter Association, who will deliver an address. The remainder of the program will include talks on and discussions of subjects of interest to members of the industry.

It is expected that 400 active members, and many manufacturing and associate members will be present.

Southern Gas Association

THE 1934 convention of the Southern Gas Association will take place March 21-23 at the Peabody Hotel, Memphis, Tenn. These dates were selected to coincide with those selected for a joint conference of the Southern Regional Sales Council and the Southwestern Regional Sales Conference.

According to S. L. Drumm, of New Orleans, secretary of the Southern Association, the Committee on Arrangements is completing a program which will include outstanding speakers from all branches of the gas industry.

B. B. Ferguson, president of the Portsmouth Gas Company, Portsmouth, Va., is president of the Association.

Mid-West Gas Association

RESERVATIONS indicate there will be a large attendance at the annual convention of the Mid-West Gas Association, which will open its three-day session April 16 at Sioux City, Iowa. Headquarters will be at the Hotel Warrior. Hotel reservations should be made direct.

According to R. B. Searing, secretary-treasurer of the Association, the convention program promises to be unusually attractive. Details will be announced later.

The annual banquet will take place at the Warrior on the evening of the second day of the convention, April 17.

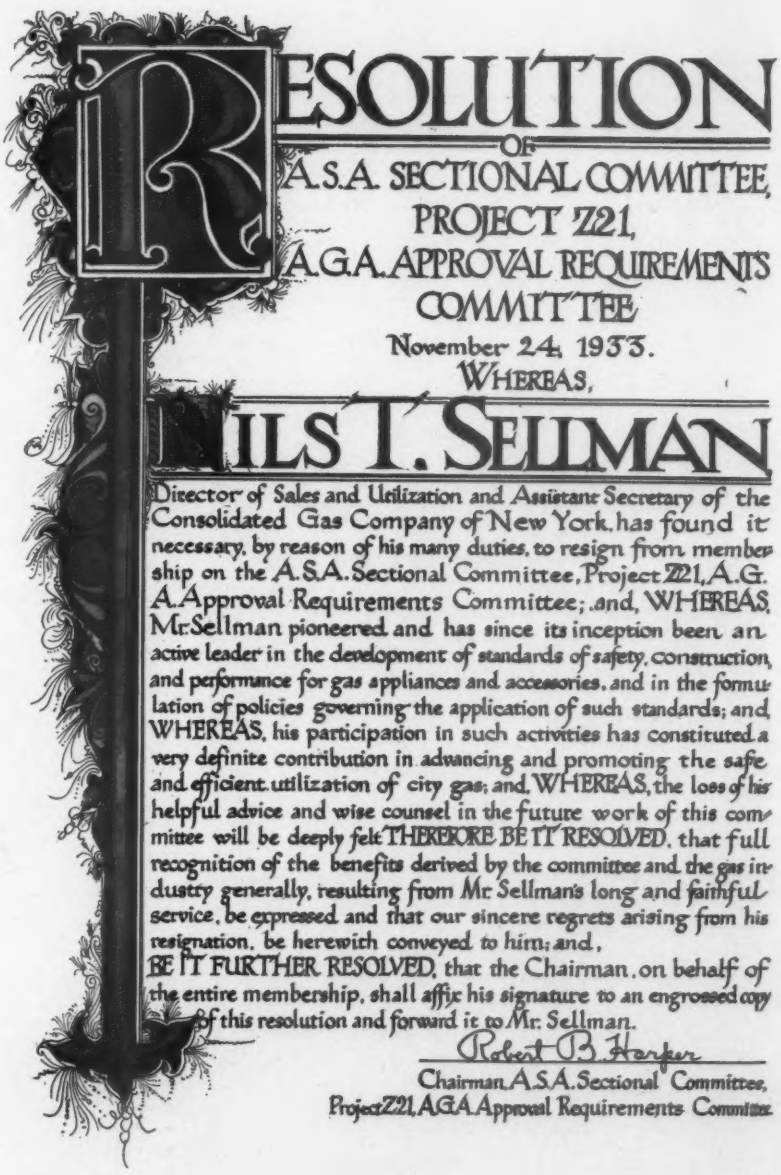
N. Y. Commercial Group Elects Officers

THE Commercial Council of the Consolidated Gas Company of New York and affiliated gas companies elected the following officers at its annual meeting, January 10: Chairman, G. A. Burrows, manager, Commercial Department; vice-chairman, Henry Obermeyer, assistant to vice-president; and recorder, H. F. Weeks, assistant director, Editorial Bureau.

Executive Committee—F. W. Crone, director, Editorial Bureau; J. A. Malone, assistant general sales manager; C. E. Muehlberg, assistant general superintendent, Customers' Service Department; and J. F. Rooney, assistant to vice-president.

Tribute to N. T. Sellman

By Fellow Committeemen



This engrossed and illuminated resolution will be presented to Nils T. Sellman at a meeting of the American Gas Association Executive Board, in Chicago, March 21. Mr. Sellman for years has been active in Association affairs, and besides his other association duties this year he is serving as chairman of the Commercial Section

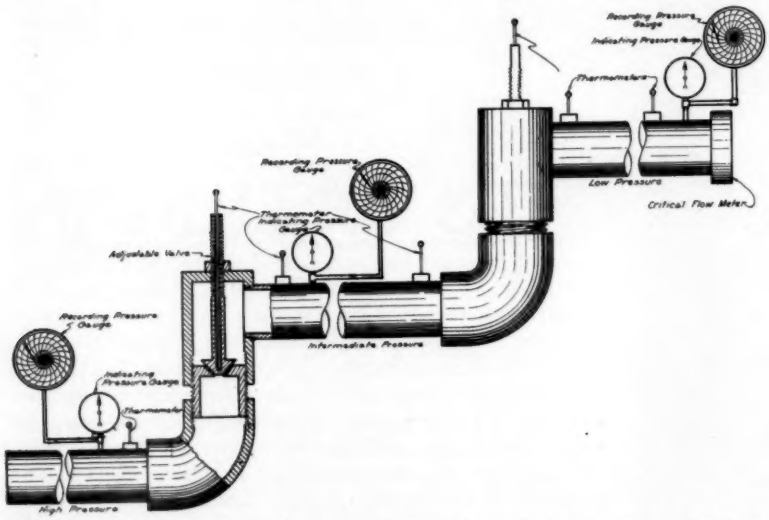
Research Under American Gas Association Fellowship

E. T. Harrison

THE Natural Gas Fellowship at the University of Oklahoma, which is sponsored by the Natural Gas Department of the American Gas Association, was awarded to Ed. T. Harrison again this year. Mr. Harrison, formerly an employee of the Lone Star Gas Company, Dallas, Texas, is a senior in the School of Natural Gas Engineering.

Mr. Harrison has chosen for his undergraduate research project a problem which is vitally important to the gas industry, "A Study of the Cause and Effect of Regulator Freezing." The work is being done in collaboration with Don Sillers of the Lone Star Gas Company. This company has a regular station equipment with necessary recording thermometers and pressure gages for the purpose of collecting data under actual field operation conditions. The laboratory experimentation is being carried on at the University of Oklahoma in the Natural Gas Engineering laboratories.

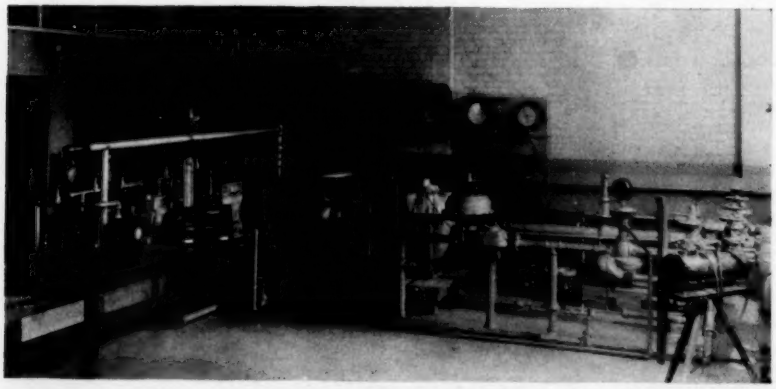
As it is known by most men in the natural gas industry the freezing generally occurs during cold weather and when a comparatively small volume of gas is being handled. Those who have made a thermodynamic study of the Joule-Thompson effect know that there is a temperature change with pressure drop when gases flow through an expansion valve. If the pressure drop is great enough the cooling effect would naturally cause a freezing of the vapor in the gas. In most commercial installations the pressure differential is not great enough to cause a freezing condition due to the Joule-Thompson effect alone.



Sketch, made by E. T. Harrison, of apparatus being set for research on freezing of regulators

Apparatus as shown in the sketch is being constructed for the purpose of making thorough thermodynamic study of the gas as it passes through the valve. It will be noted that the valve stems are hollow thus forming a thermometer well. The valves can be adjusted so that the opening will be any amount desired.

In the laboratory tests, gas under pressure will be passed through coils which are immersed in brine solution so that the temperature can be reduced to that which is comparable to winter conditions. The tests will be conducted in such a manner that they will correlate the findings on a pure science basis with solutions of the freezing problems now used in practice, and an attempt will be made to determine the limits through which these methods can be used.



Gas Metering and Regulation Laboratory, School of Natural Gas Engineering, University of Oklahoma. This equipment was installed by manufacturers who have exhibited at the Southwestern Gas Measurement Short Course, and is of the latest type

Air Conditioning Course Opens in Brooklyn

THE Polytechnic Institute of Brooklyn, Brooklyn, N. Y., last month inaugurated a course in the study of air conditioning. It is being conducted by members of the staff of the Department of Engineering under the leadership of John Everetts, Jr. and under the personal supervision of Professor E. F. Church, head of the Department of Mechanical Engineering.

The course includes the theory of air conditioning and its adaption to practice, calculations and designs of loads and load factors and the study of the theory and apparatus of refrigeration and other methods of producing modern air conditioning.

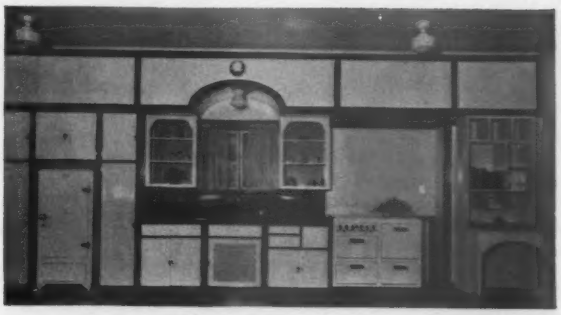
The course consists of lectures, some illustrated, classroom calculations and discussions and visits of inspection of typical installations. It is expected that the course will appeal to those engaged or interested in the field of house heating, cooling and air conditioning. From time to time specialists in the field will act as guest lecturers.

Gas Meter Is 90 Years Old

The gas meter reaches its ninetieth birthday during this year. Yet at this venerable age, the meter has come down through nearly a century with scarcely a change in principles of construction from the first meter used in London in 1844. Hundreds of inventors have tried to produce something different and better, but have succeeded only in improving on details and that success has been attained only by following the original mechanical principles adopted ninety years ago for the correct measurement of gas.

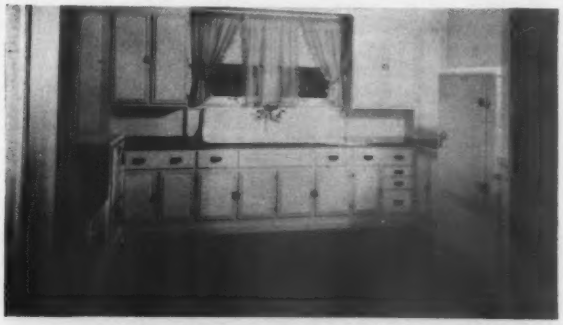
Modern Gas Kitchens

Demonstration kitchen,
Washington Gas Light Co., Washington, D. C.



One of Boston Consolidated Gas Company's home service kitchens

"NRA Kitchen," Architects' Building,
Philadelphia Gas Works Company



Home service department kitchen,
Grand Rapids Gas Light Company

Breakfast nook, display floor kitchen,
Central Hudson Gas and Electric Corp.

"Kitchen Compact," The Brooklyn Union Gas Company,
Brooklyn, N. Y.

Home service demonstration platform,
Public Service Electric and Gas Co., Newark, N. J.

Sales floor display kitchen, Providence Gas Company,
Providence, R. I.

HOME SERVICE COMMITTEE

DOROTHY E. SHANK, Chairman JESSIE McQUEEN, Secretary

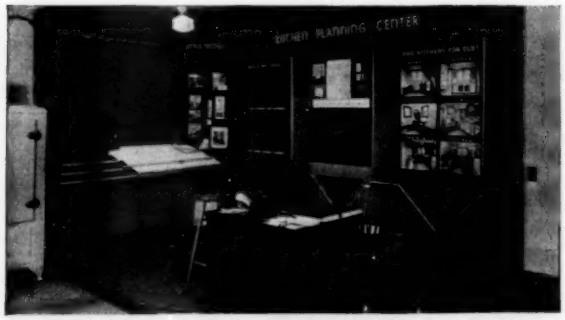
Kitchen Planning Shows Progress

By Jessie McQueen

Home Service Counsellor,
American Gas Association

PROGRESSIVE gas companies, in realizing that an attractive sales floor does much to bring people into their offices, have enthusiastically adopted the plan of an all-gas modern kitchen in sight of everyone. A considerable number of utility companies have put such a kitchen on their sales floor, and in many additional offices have modernized the present demonstration platform for the use of home service classes. The opportunity to see appliances in operation, to see them in attractive settings, and to see the many uses for them, offers a direct sales appeal. Most people,—women particularly, are sight-minded and the attractive display will sow the seeds of desire in many customers' minds.

Kitchen Planning Headquarters have been established in the offices of several companies, with one member of the home service department placed in charge as consultant in the drawing up of kitchen plans. Planning desks have been included in some of the kitchen lay-outs as they are useful in a woman's home kitchen for the many details of kitchen management.



Kitchen planning center in Flushing Office of the Consolidated Gas Company of New York

The Consolidated Gas Company of New York has a kitchen planning headquarters as shown in the illustration, with Frances Leonard in charge as kitchen consultant, the entire kitchen planning work of this company being under the direct supervision of Althea Lepper, director of the department.

The pioneer in kitchen planning work, The Central Hudson Gas and Electric Corporation, Poughkeepsie, N. Y., recently has placed a new display kitchen in its central sales office. Since many of this company's customers are descendants of early Dutch settlers along the Hudson, the display department, under the direction of V. E Shepherd, has incorporated some old Dutch ideas,—leaded windows, simulated hand-hewn beams of Flemish oak, blue and orange-yellow as a color scheme, Dutch tile design on the range, old pewter pieces on a rail above the equipment, and a breakfast nook with oak handmade furniture in one corner of the room. Our illustration shows this breakfast nook as well as another interesting feature of the kitchen,—a wall panel which opens as a door, in which are placed the cleaning articles needed in the house. Ruth Kleinmaier, of the home service department, supervises the kitchen planning work of this company.

In Grand Rapids, The Grand Rapids Gas Light Company has now completely renovated its home service department and auditorium platform. Three display kitchens have been equipped with modern appliances, as has also a demonstration platform. In starting the kitchen modernization plan in Grand Rapids, a playlet was written and produced before the entire body of employees, showing the old-time kitchen and its transformation into a new and modern one with attractive new gas appliances. Mabel Claire Atwood, home service director, reports an unprecedented interest by women in these new kitchens.

Sales floor kitchen, New York & Queens Gas Company, New York

Kitchen planning work in the Public Service Electric & Gas Company of New Jersey was inaugurated in the Spring of 1933 with a series of six large newspaper advertisements, each one carrying a complete kitchen arrangement as planned by people well known to their readers. Among these were Katharine Fisher, Good Housekeeping Institute; Grace Pennock, Delineator Institute; the head of the Home Economics Department of the New Jersey State College for women; and Ada Bessie Swann, director of the home service department, who supervises the planning work being done in the different home service departments through this New Jersey system. In addition to the illustrated demonstration platform, the Newark Office has a complete kitchen arrangement on display in one of the sales floor windows.

The Boston Consolidated Gas Company, Boston, Mass., has three span-new kitchens, which are creating much attention in their company offices. In the central Boston office, a portable kitchen, looking perfectly permanent, has been set up. It can be used not only for demonstrations in this company office, but easily set up for outside meetings, thus being shown, as Ruth Feeney, the home service director, reports, to very fine advantage at home shows, newspaper schools, and women's clubs' meetings. Two other kitchens in the Newton and Quincy offices, one of which is illustrated, are used in connection with demonstration rooms, where a seating capacity has been arranged for from 100 to 200 people.

We hear frequently of the "Kitchen Compact," and in the Flatbush office of The Brooklyn Union Gas Company, Brooklyn, N. Y., this arrangement is used as the demonstration platform in the very attractive home service apartment, which is part and parcel of the sales floor arrangement in this office. George Nast, the architect used by this company in drawing up requested kitchen plans, has given a series of talks to the regular women's classes of the home service department, which is under the directorship of Ruth Soule.

The Philadelphia Gas Works Company, Philadelphia, Pa., was the first company to set up a complete kitchen planning headquarters apart from the regular company offices, by going directly into the Architect's Building in Philadelphia, with an unusually attractive display of four differently designed kitchens, which are entered as if entering a lovely colonial home. There, visitors are met by the kitchen planning consultant of this company, Babbette Eiseman, who assists them in their kitchen planning problems. The Philadelphia Company has, likewise, set up the Kitchen Compact in its central office as a testing kitchen, and as a further service, takes the idea of kitchen planning right into the community neighborhood with the new "Kitchen On Wheels," which is described and illustrated elsewhere in this number of the MONTHLY. Beatrice Wagner, director of home service, has supervised the installation of these kitchens.

In Washington, D. C., customers coming into the Washington Gas Light Company office, can see a very homey and modern kitchen located in the centre of the sales floor. Salesmen make extensive use of this kitchen in interesting their prospects in modern gas equipment in an attractive home setting, and Ruth Sheldon, home service director, conducts frequent cooking demonstrations to groups of from fifteen to twenty-five invited women, who can be closely seated together at one side of the kitchen, where they can make close observation of the cooking processes.

A newly fashioned kitchen on the sales floor of the Providence Gas Company, Providence, R. I., has attracted an average of 200 people a week, who are personally introduced to features of modern gas equipment. Kathleen Atkinson, home service department, reports that many, many more see it and she observes that the sink attracts their attention first, since many of the women have never before seen one of monel metal. Holiday demonstrations were given in the kitchen and salesmen have been using the set-up extensively as do a number of the local architects, who have sent in some of their customers to see it.

Kitchen planning work has thus gained much impetus in many gas companies. In every instance that has been brought to our attention, the project is under the direct supervision of the home service departments. These directors have reported the great assistance that has been gained through the A. G. A. book on "Modern Kitchens"—a handbook for design and construction. This book is available from the American Gas Association at $3 per copy. The consumer piece—"The New Technique in Kitchen Work"—likewise is available from Association Headquarters in any quantity at 13 cents each, with company imprint allowed. This has also aided in advancing the idea of "The Modern All-Gas Kitchen" in other companies as well as those mentioned.

Demonstration Coach Builds Sales in Philadelphia

Demonstration coach of The Philadelphia Gas Works Co.

SHOULD you visit Philadelphia in the near future and see a brick house moving along a street, don't blame failing eyesight.

What you see is the new traveling showroom of The Philadelphia Gas Works Company.

This novel vehicle outwardly resembles a typical Philadelphia colonial brick house. It is designed to carry a display of gas appliances in realistic home settings direct to the doors of the company's customers.

It consists of a lightweight two-wheel trailer coach, approximately twenty-five feet long, which is drawn by a six-cylinder coupe. Red brick walls, a green shingled roof, and doors and window sash finished in "antiqued" ivory combine to give the coach an authentic colonial style that is both distinctive and attractive.

The forward part of the coach represents a modern and correctly planned kitchen that would fill any woman's heart with envy. It is furnished in soft shades of blue, peach and ivory and floored with inlaid rubber tile. It has the newest style cupboards, a monel metal sink and work table, and a neat little planning desk. Most intriguing of all are its beautiful automatic gas range and Electrolux gas refrigerator, both of which are placed according to a definite plan for saving time and energy.

In the rear part of the coach is a modernized basement setting, with fanciful wall and floor designs which effectively set off an automatic gas water heater and gas furnace display.

Most of the gas appliances displayed, including a gas steam radiator used in heating the coach, are demonstrated in full operation. The gas fuel, which is identical with that supplied to Philadelphia homes, is obtained from cylinders carried in a special compartment.

The coach is manned by a uniformed driver, local sales representatives and a home service division instructor who acts as hostess and conducts cooking demonstrations. Each day it is stationed in a different section of the city, where housewives of the neighborhood may visit the display. It is also planned to extend its use from time to time to leading gas appliance dealers of the city.

Much public interest has been shown in this unusual method of displaying and demonstrating modern gas appliances, and many sales already have been traced to its influence.

Natural Gas Engines Feature of County Fair

For ten years gas engines operating on natural gas have been exhibited by gas companies at the Los Angeles County Fair, an annual event held at Pomona, California. At the last Fair fifteen gas engines, all operating, and most of them driving machinery of various kinds, were exhibited. These were all modern high speed multi-cylinder engines entirely enclosed, with automatic features such as oil and cooling water protection, and are easily started and easily kept clean. One of the engines was directly connected to an electric generator which supplied current for ornamental illumination of the booth. The engines operated so quietly that one could speak in an ordinary tone of voice when they were all operating and easily be heard. The engines ranged in size from 23 H.P. to 200 H.P. and from two cylinders to six cylinders.

The exhibit each year is sponsored by the Natural Gas Bureau which in turn is sponsored by the three local gas utilities—the Los Angeles Gas & Electric Corporation, the Southern California Gas Company, and the Southern Counties Gas Company. The Bureau was assisted by the manufacturers and local distributors of the fifteen engines.

ACCOUNTING SECTION

Performance Yardsticks*

By E. N. Keller
Philadelphia Electric Co.

THE problems of managing an office today is an extremely intricate one and requires the services of an individual possessing diverse qualifications. Present conditions make necessary not only efficient economic operation but the exercising of unusual tact and diplomacy in accomplishing the desired results.

Whether or not the one in charge of such responsibilities is employed by a utility or an industrial concern, the problem is similar although not subject to the same mode of attack. Either one, however, must have some sort of yardstick as a guide in following office costs and results, so that pressure can be properly applied when necessary for elimination of excess labor.

The industrial accountant is in a more fortunate position, in some respects, in solving the problem than the utility man because business conditions in industry generally are largely dependent on the flow of orders with their attendant accounting work. When these fall off such condition is known at once, and it is possible to make the proper adjustments to compensate for the change.

In the utility business, any falling off in sales and revenue is not necessarily due to a loss of customers, but may come about mainly from decreased use, in turn the reflection of lessened activity in the industrial field. Therefore, the utility accounting supervisor is confronted with the necessity of reducing office costs as a direct result of reduced revenue, but without having the problem solved by having a lessened number of customers to handle.

For this reason, the utility man must be more on the alert for economies than his brother in the industrial field, and this has required that no stone be left unturned to determine the places where this can be accomplished. However, there is an advantage that the industrial man does not enjoy to the same degree. Utility commercial office work lends itself remarkably well to proper routing and productive measurement because it recurs each month in practically constant quantities. This fact can be used to good advantage in several different ways.

It is possible to a certain degree, because of some similarity in the work of one utility company with that of another, to compare costs for different types of work and analyze to determine how the "other fellow" is accomplishing lower costs in certain respects. The difficulty in getting the most out of such comparisons, however, lies in the fact that the practices, procedures, and policies of different companies vary, and it is extremely hard to make compensating allowances therefor.

Where the utility company is a large one, however, comparison between commercial offices is not only possible but very practical. This is feasible because in most cases the method of doing various types of work is the same in each office, and, therefore, susceptible to ready comparison. It goes without saying, of course, that before any tangible results can be obtained there is an enormous amount of preliminary work in standardizing each office's functions in respect to procedure; in addition, wage rates and job specifications must be studied and adjusted.

One very effective means of accomplishing results in this respect is the use of a tabulation showing the respective job classifications in each office with the number of clerks and total amount of salaries paid and the total number of units. The units may be meters, customers or accounts. Then, this is sub-divided into the number of units per clerk and average wage per clerk. From this, it is possible to point out to the offices using a greater amount of labor, measured in units per employee, the one office producing the best results, thus revealing an overmanned condition. Very often, of course, it will be found in making such comparisons that the office seemingly overmanned is not actually so for the reason that there may be some type of necessary operation prevalent in that office, not uniform in character, for which allowance has not been made. In other offices, it may develop that the over-manning is due to inefficient employees.

It is true, of course, that some offices may require more help for a certain operation than another with a similar number of units due to circumstances beyond control and for which due compensation must be made. For instance, take the matter of collections. The paying habits of customers vary with their financial and other conditions and in some sections more collection calls must be made to produce efficient results than are necessary in some other section.

When all refinement that is possible under this plan has been accomplished, or coincident with this plan, a scheme of measurement of individual operations in an office is of practical use. Take for instance, entering of meter orders in meter binders, sorting of cash stubs, posting of cash, balancing, typing of fanfold notices and many similar operations are readily susceptible to setting up a standard day's work in number of units. This, of course, can be done only only after extended study. Once these standards are set, provided there is no radical change in procedure, the accounting supervisor has a very definite yardstick to measure individual or group performance.

This then definitely ties in with the tabulated analysis of units per clerk for job classifications because it further enables the supervisor to determine the clerk or clerks who are the cause of the poor standing.

All of these things are extremely helpful, in fact necessary, in scientific office management, for such offices are usually fairly large units and the individual in charge of activities cannot possibly know the qualifications of every individual employee and even if this were so, he must be able to judge by some standard other than guess work.

Coupled with this problem is one for the Supervisor in charge of all offices, as dependence must be placed almost entirely on the men chosen to direct the accounting work in the various offices. Therefore, such selections must be made with care and with a view to obtaining men adaptable to training, so that the supervisor's instructions and viewpoint may be thoroughly understood. However, the general supervisor does have composite reports and tabulations before referred to and is thus in a position to point out to any accounting supervisor wherein the difficulty lies and suggest methods of correction.

Periodical meetings of the accounting supervisors with the general supervisor are also extremely productive because at such times it is possible for the supervisor to issue verbal instructions and discuss problems, designed to transmit information useful to all concerned. Such meetings can also be made the place for discussion regarding changes in practices, policies or procedures, which, of course, should be made of record in the form of minutes. Rulings requested by Office Managers which cannot be made at the time can be obtained prior to the writing of the minutes.

There are several other angles to the solution of the problem of the accounting supervisor, which must be borne in mind at all times. One is the matter of personnel and the care with which employees must be handled during these trying times. A good supervisor must continually keep before him the fact that employees, no matter what the grade may be, are human beings and they have had their trials and tribulations accentuated in the past few years to a degree greater than ever before.

In addition, there are employees who are

* Contribution of the Customer Accounting Committee.

COMPARATIVE STATEMENT OF NUMBER OF BILLS AND DELINQUENT ACCOUNTS HANDLED PER EMPLOYEE
(Excluding Temporary and Branch Office Personnel)

Division	District "A"		District "B"		District "C"		District "D"		District "E"	
No. of Bills	35,275		13,389		41,095		34,967		53,071	
	Emp.	Aver. Bills	Emp.	Aver. Bills	Emp.	Aver. Bills	Emp.	Aver. Bills	Emp.	Aver. Bills
Supervision & General	2		1.5		2.5		2		4	
Customers' Accounting	14.5	2433	4.75	2819	16.5	2491	13	2690	21	2527
Merchandise Accounting	3		1		2		2		3	
Collections—Clerical	7.9	4465	2	6695	7	5871	7	4995	14	3701
Cashiers	3	11758	1.5	8926	2	20548	2	17484	4	13268
Mailing Unit	2	17638	5	26778	2	20548	1	34967	2	26535
Met. Rdg. & Con. Load—Clerical (electric)	1	35275	.25		1.5	27397	1	34967	1	53071
TOTAL	33.4	1056	11.5	1164	33.5	1228	28	1249	49	1083
Position		5		3		2		1		4
Delinquent Accounts		6896		2900		7226		5850		14720
	Emp.	Aver. Delq. Accts.	Emp.	Aver. Delq. Accts.	Emp.	Aver. Delq. Accts.	Emp.	Aver. Delq. Accts.	Emp.	Aver. Delq. Accts.
Collections—Clerical	8.65	797	2	1450	7	1032	7	836	17	866
With Coke Adjustment	7.9	873							14	1051
Collections—Outside	7	985	2.5	1160	8	903	8	731	12	1227
With Coke Adjustment	6.7	1029							10	1472
Coke Adjustments Used Above[a]										
Collections—Clerical	.75								3	
Collectors	.3								2	

No. of Employees Required Based on a Standard Attainment of 1200 Bills Per Employee (Excluding Employees Required for Clerical Work on Coke Accounting and Collections.)

District	Est. Employees
A	29.5
B	11.5
C	33.5
D	28.0
E	45.0

No. of Employees Required Based on a Standard Attainment as Follows:
Inside—1000 delq. Accts. Per Emp.
Outside—1100 delq. Accts. Per Emp.
(Excluding Employees Required for Coke Operations.)

District	Est. Employees Inside	Outside
A	7	6.5
B	2	2.5
C	7	7
D	6	6
E	14	10

[a]Adjustment for comparative purposes, on account of employees required for coke operations

conscientious and hardworking, but who do not have the necessary ability to advance. On the other hand, they probably do not recognize their shortcomings and feel that they too are deserving of recognition. In such instances, morale must be kept at its highest and it requires tact to explain to the employee just where he stands in the organization.

Also, all utility employees have the very vital question of customer relations confronting them. Therefore, in attempting to lower costs, revise procedures, and the many other ramifications of an accounting supervisor's duties, there must be weighed the advantages to the company as a whole in the relation between reduced costs and reduced service.

While all of these questions are troublesome yet every cloud has its silver lining, and any man fortunate enough to be in a position where such problems must be solved can build, during present times, an admirable record individually and for all concerned, if the various activities in conjunction with the job are conducted properly and intelligently.

Accounting Section Committees Meet At Headquarters

A MEETING of the Advisory Committee, followed by a joint meeting of the Managing and Advisory Committees of the Accounting Section, was held at Association Headquarters, December 20. A satisfactory and representative attendance was had and arrangements were made to include the following subjects in the programs of the Section's committees for the ensuing year:

Compendium Committee

This represents a new committee, and C. J. Fue, of The Brooklyn Union Gas Company, chairman, explained that the committee had been planned and organized for the purpose of making through its individual members a general review of all committee work undertaken by the Accounting Section to date; to prepare a report which will briefly evaluate the progress made on each subject, including the reviewer's opinion as to further work that might be undertaken under present conditions, and to prepare a bibliography of the activities of the Accounting Section; the final report of the committee to form the basis of a balanced program for future sectional activities.

It is hoped that the committee's report will not only be of service as a guide for future programs of the Accounting Section, but that it will also prove valuable as a résumé of the subject matters that had been developed up to the present time which constructively may be used by future committees. It is proposed to publish in the MONTHLY an outline of the program of this committee, including a classified summary of the Accounting Section activities on various subjects to date.

Accounting Machines Committee

Among the subjects recommended for consideration by this committee for the coming year were the following:

1. Customer billing and sales analysis.
2. Fundamental charts—perpetuation so as to record new developments in machine equipment.
3. Wrinkles.
4. Survey of fields undeveloped mechanically.

Customer Accounting Committee

The Customer Accounting Committee will consider among other things the following subjects:

Information on customers' bills.
Centralization vs. Decentralization.
Reading, billing and collecting at one time.
Handling of cash receipts.
Etc.

Customer Relations Committee

Among the subjects discussed for the committee's program were included:

1. Developing in the employee a sense of personal responsibility for customer relations.
2. Building good will outside of office hours.
3. Efficiency and its effect on customer relations.

Editorial Committee

This represents a new committee organized to prepare a schedule of Accounting Section articles for the MONTHLY to be indicative so far as possible of the type of material to be secured from committees and other sources. This schedule wili be designed to guarantee a sufficient number of contributions to provide two articles per month for a twelve-month period. A. S. Corson, vice-chairman of the section, will act as chairman of the committee which, in addition to securing articles, will have the duty of acting as an Editorial Committee both with regard to the MONTHLY articles and with regard to the section's reports as prepared for the Convention.

Exhibit Committee

The Exhibit Committee was revived this year in view of the fact that the Association is planning to hold an exhibit in connection with their Convention in Atlantic City. Sidney Curren was appointed chairman and the committee will endeavor not only to interest manufacturers of office labor saving devices in exhibiting at the Convention, but also will encourage member gas companies to display new or unique exhibits of accounting methods and procedures which would be of interest to those attending the Convention.

General Accounting Committee

F. J. Bischoff, Jr., chairman of the committee, reported that in addition to including any new material in regard to budgets and audits, the committee was planning a review of forms used by production and distribution departments from the standpoint of their value as accounting records. This would include forms affecting plant and property, as well as forms for routine purposes. It is also proposed, in cooperation with the Natural Gas Representatives Committee, to give consideration to natural gas pipe line operating costs and statistics. Coordination with the Customer Accounting and Accounting Machines Committees was recommended in connection with a proposed study of the General Accounting Committee of various methods used in connection with compiling sales statistics, as well as methods of crediting active consumers' accounts with interest on deposits.

Office Management Committee

E. J. Tucker, chairman of the Office Management Committee, reported that it was fortunate in having an unusual number of activities suggested, but in view of the limitation of the time it was proposed at the organization meeting of his committee, to be held in New York on February 7, to concentrate only on a number of subjects which the committee felt could be adequately treated.

Among the subjects discussed was a study of the cost of reproducing letters covering all known reproduction equipment; a report describing the incentive plan for collectors of the Philadelphia Electric Company and its results after one year's operation; the preparation of a manual of form letters such as are used in most companies for collection follow-up, customer service, information, etc.

Natural Gas Representatives Committee

L. L. Dyer, chairman of the Committee on Natural Gas Representatives, reported that from the very nature of the work assigned to the committee, it would be difficult to determine on a program prior to their organization meeting. The committee work is designed to develop accounting problems of particular interest to the natural gas accountant, and it was suggested that as part of its activity this year the committee might very well present the natural gas accountant's viewpoint on such activities of the other Accounting committees as seem to be of most interest to the natural gas man.

Standing Committees

Organization was reported of the Committee on Uniform Classification of Accounts, and the Committee on A. G. A. Statistics, the work of both committees being dependent on the need for action as it may arise.

A. S. Corson reported that in his capacity as chairman of the Committee on Affiliated Representatives, he planned to continue the endeavor through this committee to obtain closer contact with the work of the affiliated State and District Associations.

On the following day—December 21—a special meeting of the Committee Chairmen was held for the purpose of coordinating all activities throughout the year.

The members present at the meetings included:

E. B. Nutt, chairman, Accounting Section; A. S. Corson, vice-chairman, Accounting Section; and chairman, Editorial and Affiliated Representatives Committees; J. M. Roberts, chairman, Advisory Committee and Nominating Committee; W. S. Bowser, chairman, Accounting Machines Committee; F. J. Bischoff, chairman, General Accounting Committee; H. M. Brundage, chairman, Uniform Classification of Accounts Committee; Sidney Curren, chairman, Exhibit Committee; L. L. Dyer, chairman, Natural Gas Representatives Committee; H. M. Brundage, chairman, Uniform Classification of Accounts Committee; H. C. Davidson, chairman, Statistics Committee; C. J. Fue, chairman, Compendium Committee; E. N. Keller, chairman, Customer Accounting Committee; W. G. Murfit, chairman, Customers' Relations Committee; E. J. Tucker, chairman, Office Management Committee; E. A. Berry, F. L. Blackburn, J. I. Blanchfield, C. H. B. Chapin, H. E. Cliff, J. L. Conover, W. A. Doering, C. E. Eble, H. A. Ehrmann, F. B. Flahive, T. S. Lever, D. H. Mitchell, Edward Porter and A. L. Tossell.

Distribution Conference—Book-Cadillac Hotel, Detroit—April 9 and 10, 1934

TO the distribution engineer the Distribution Conference is the event of the year. Therefore, while it is a little too early to announce a tentative program for the 1934 Distribution Conference, it is in order to urge that all distribution engineers now make their plans to be in attendance as the program will be well worth their while.

It may be said that the keynote or plan for the program of the 1934 Conference has been built around the main thought of having presentations which will reflect actual economies accomplished in the various divisions of the work. This theme or main thought was selected as it was the feeling of the Distribution Committee that one of the greatest contributions they could make to recovery would be a continued vigilance in accomplishing further economies in investment and operating costs in all their work. As the program has developed to date, presentations of the above character have been arranged for as follows:

Contribution by C. E. Muehlberg, Consolidated Gas Company of New York, relating to work done on consumers' premises; a contribution by H. L. Gaidry, New Orleans Public Service, Inc., on removing and resetting meters and turn on and off expense; a paper by H. D. Lehman, Philadelphia Gas Works Company, on connecting ranges, water heaters, refrigerators and house heaters; a paper on the distribution office by H. A. Anderson, Syracuse Lighting Company; a paper on maintaining installations by R. H. Taylor, Public Service Company of Colorado, Denver, Colo.; a paper on storeroom operation by A. I. Snyder, Detroit City

(Continued on page 70)

COMMERCIAL SECTION

N. T. SELLMAN, Chairman J. W. WEST, Jr., Secretary F. M. ROSENKRANS, Vice-Chairman

Eastern Natural Gas Sales Conference Opens February 8 in Pittsburgh

THE 1934 Eastern Natural Gas Regional Sales Conference will take place at the William Penn Hotel, Pittsburgh, Pa., February 8 and 9. Unusual attention is being directed to this annual event, which is sponsored by the Commercial Section of the American Gas Association, and a large attendance is expected.

The program follows:

Thursday, February 8
10:00 A.M.

Opening Remarks by the Chairman
E. E. McCormick
The Peoples Natural Gas Co.
Pittsburgh, Pa.

Keynote Address
N. T. Sellman, *Chairman*
Commercial Section, A.G.A.
New York, N. Y.

Market Possibilities of Space Heating

With Radiant Heaters
W. G. Carlin
Natural Gas Co. of W. Va.
Wheeling, W. Va.

General Discussion

With Circulating Heaters
O. J. Haagen
The Gas and Electric Appliance Co.
Columbus, Ohio

General Discussion

With Unit Heaters
L. F. Ryall
General Gas Light Co.
Kalamazoo, Mich.

General Discussion

Round Table on 1934 Space Heating Plan

Thursday, February 8
2:00 P.M.

Presiding: S. B. Severson
Republic Light, Heat & Power Co., Inc.
Buffalo, N. Y.

Refrigeration from the Natural Gas Viewpoint
B. H. Gardner
Columbia Engineering & Management Corp.
Columbus, Ohio

General Discussion

Rental—Lease—Sales—Plans
W. A. Tobias
Hagerstown Light and Heat Co.
Hagerstown, Md.

General Discussion

Large Volume Water Heating
H. B. Yost
Hope Natural Gas Co.
Clarksburg, W. Va.

General Discussion

Friday, February 9
10:00 A.M.

Presiding: F. B. Jones
Equitable Gas Co.
Pittsburgh, Pa.

Customer Reaction from the Home Service Viewpoint
Elizabeth Sweeney
Empire Gas & Electric Co.
Geneva, N. Y.

General Discussion

Holding and Developing the Industrial Gas Load
Karl Emmerling
East Ohio Gas Co.
Cleveland, Ohio

General Discussion

Necessity of Sales Development from the Executive's Viewpoint
J. French Robinson
Peoples Natural Gas Co.
Pittsburgh, Pa.

General Discussion

Friday, February 9
2:00 P.M.

Presiding: B. H. Gardner
Columbia Engineering & Management Corp.
Columbus, Ohio

Effective Advertising under Today's Conditions
Emil Hofspos, V. P.
Ketchum, MacLeod and Grove
Pittsburgh, Pa.

General Discussion

Hotel and Restaurant Sales Development Activities
R. H. Staniford
The Brooklyn Union Gas Co.
Brooklyn, N. Y.

General Discussion

Winter Air Conditioning
S. H. Baldwin
Bryant Heater Co.
Cleveland, Ohio

General Discussion

New Zealand Wants More A. G. A. Sales Helps

"DOWN under," they like American Gas Association sales promotional material. H. C. Ridley, sales manager of The Christchurch Gas, Coal & Coke Company, Limited, Christchurch, New Zealand, wrote C. N. Lauer, chairman of the National Directing Committee of Executives, as follows:

"We have received your pamphlets, etc., in connection with modern kitchens.

"I have before me your publication, 'The New Technique in Kitchen Work.' This is beautifully prepared, and should be of immense assistance to Gas Sales Managers.

"I think so much of it that I propose to send a copy to every reputable builder and architect in this city. Therefore, please send us at your earliest convenience, three hundred copies of this book. Kindly have printed on the folder, 'Presented by the Christchurch Gas, Coal & Coke Co., Ltd.,' and nothing else is necessary but the name.

"We have three copies of 'Modern Kitchens,' and we should also like some of 'Plan for Operating a Kitchen Planning Service,' which you say are available without charge."

"Modern Kitchens" is the Association's handbook for design and construction.

Supplementary Industrial Bibliography

THE trade literature for the latter half of 1933 gives further examples of the extension of natural gas into the plants of large users of fuel. A series of four articles listed below describe in detail the application of natural gas to open hearth furnaces. Other examples are given in its application to lime kilns and to power boilers.

Improvements in burner application to power boilers are reflected in the use of proportional mixers which accurately control the air supply and make boiler operation independent of stack draft.

The immersion burner continued to increase its field of usefulness. The outstanding examples are its unique application to an acid tank and its adoption in breweries for heating liquid tanks in practically all the stages of beer manufacture.

The application of the luminous flame and diffusion combustion are being extended by industrial gas engineers. New uses are described in its application to galvanizing kettles, open hearth furnaces and glass melting tanks.

GENERAL DATA—A

Heating Liquids A-12

Industrial Gas. . Worth while economies possible with immersion burners . . . . . Dec. 1933 p. 17
(Acid tank heated with lead immersion coil.)

Miscellaneous A-14

Chem. & Met. Engineering . . Gas fuel improves the lime kiln efficiency . . . . . July 1933 p. 356
(Natural gas increases kiln capacity, reduces labor, gives more uniform product.)

Industrial Gas. . Hair drying by gas cuts beauty shop costs . . . . . Aug. 1933 p. 23
(Gas-fired boiler and air heater furnishes warm air.)

Industrial Gas. . Degreasing metal parts cuts production costs . . . . . Oct. 1933 p. 7
(Trichlorethylene vapor an ideal medium for removing grease or oil from metal parts.)

Industrial Gas. . Further experiments with high temperatures . . . . . Nov. 1933 p. 7
(Life of crucibles and refractories with furnace at 2750° F.)

HEAT TREATMENT OF FERROUS METALS—B

Forging B-1

Gas Age-Record . . Fuel comparisons for billet reheating furnaces . . . . . July 29, '33 p. 103
(Operating data for soft coal, oil and mf'd gas.)

Heat Treating and Forging. . Forging temperatures of steel. Nov. 1933 p. 70
(Low limits of forging temperatures for carbon steels.)

Annealing B-3

Iron Age . . . . . Car bottom annealing furnace installations . . . . . Aug. 24, 1933 p. 20

Metal Progress. Bright annealing in mixed gas . . . . . Sept. 1933 p. 33
(Equilibrium constants as a guide to the neutral atmosphere.)

Case Hardening B-5

Metal Progress. Recent progress in carburizing with gas . . . . . Oct. 1933 p. 44
(Operation of two continuous carburizing plants.)

Cyanide Hardening B-6

Industrial Gas. . Gears that start your car . . . . Aug. 1933 p. 19
(Test results on cyanide furnace.)

Miscellaneous B-11

Heat Treating and Forging. . Time required for heating steel . . . . . Nov. 1933 p. 65
(Calculating heating time. Check with experimental determinations.)

Industrial Gas. . Effect of furnace atmospheres on the behavior of steel. . Aug. 1933 p. 7
(Effects of air, oxygen, carbon dioxide and steam. Effect of temperatures from 1000 to 2300° F. Effect of time.)

Industrial Gas. . Controlled furnace atmosphere assures scale-free production . . . . . Oct. 1933 p. 19
(Flue products cooled, mixed with raw gas and introduced to muffle. No grinding, only a slight sand blast and polish on finished product. England.)

Industrial Gas. . Refractory insulating firebrick saves fuel costs . . . . . Dec. 1933 p. 9
(Low weight and low thermal conductivity lowers radiation loss and reduces time required for heating up furnace.)

Industrial Gas. . Heat treating locomotive tires. Dec. 1933 p. 23
(Tires heated preparatory to shrinking them on wheels.)

HEAT TREATMENT OF NON-FERROUS METALS—C

Aluminum C-3

Iron Age . . . . . Continuous-type furnaces employed in forging aluminum alloys . . . . . Aug. 31, '33 p. 22
(Recirculating air heater gives uniform and rapid heating.)

METAL MELTING—D

Stereotype D-2

Industrial Gas. . Modernizing stereotype melting equipment . . . . . Oct. 1933 p. 9
(Low fuel consumption, accurate temperature control, through insulation, characterize modern immersion fired pot.)

Galvanizing D-3

Industrial Gas..Diffusion combustion and galvanizing kettles.....Sept: 1933 p. 16
(Advantages in the elimination of hot spots. High rate of heat transfer.)

Steel .....Heating galvanizing kettles by diffusion combustion.....Nov. 13, '33 p. 24
(Replaced coke-fired installation. Resulted in reduced dross formation, longer kettle life, lower over-all cost of production.)

Die Casting D-9

Iron Age.....Brass pressure castings are produced economically....Nov. 30, '33 p. 16
(Results of brass die-casting experiments.)

Miscellaneous D-12

Industrial Gas..The smelting industry adopts gas fuel.....Nov. 1933 p. 8
(Roasting ores, smelting copper and lead.)

Iron Age.....Open hearth furnaces with natural gas firing.....Aug. 31, '33 p. 11
(Reduced maintenance costs, improved combustion, better quality of steel.)

Iron Age.....Ports of open hearth furnaces fired with natural gas....Sept. 7, '33 p. 14
(Port design, method of entraining gas.)

Iron Age.....Regenerator chambers for furnaces using natural gas....Sept. 14, '33 p. 21
(Calculation of sizes and points of design peculiar to natural gas firing.)

Iron Age.....Controlling combustion in the open hearth furnace.....Sept. 21, '33 p. 13
(Automatic operation is simply achieved with natural gas as fuel.)

Western Gas...Converting metallurgical furnaces to natural gas.....June 1933 p. 10
(Application of luminous flame to open hearth furnaces.)

INDUSTRIAL STEAM APPLICATIONS—E

Gas Age-Record ..Off-peak gas for year-round service .....July 1, '33 p. 3
(Luminous flame gas burner on 250 h.p. boiler increases flexibility and efficiency.)

Industrial Gas..Up-to-date methods of boiler firing .....June 1933 p. 19
(Proportional mixing equipment gives better control of air supply.)

Power .....High heat liberation with gas in Dallas boilers.....Aug. 1933 p. 410
(Complete premixing of gas and air insures low excess air and high efficiency.)

FOOD PRODUCTS—G

Miscellaneous G-6

American Gas Journal ....Gas-fired immersion burners in the brewery.....Dec. 1933 p. 23
(Expense of additional boiler and attendant avoided by direct firing of brew kettle with immersion heater.)

American Gas Journal ....Technical literature shows advantage of direct heat on a brew kettle.....Dec. 1933 p. 25
(Outline of brewing process. Continental experience shows that momentary contact at high temperature imparts a desirable flavor.)

Food Industries.How to control banana ripening .....Sept. 1933 p. 341
(Temperature, humidity and time for ripening.)

Gas Age-Record ..Gas in the modern brewery..Sept. 9, '33 p. 227
(Gas used for steam cooking, bottle washing, beer pasteurizing, pitching and preheating kegs, drying vats, for torches and branding machines.)

Industrial Gas..Drying prunes at a lower cost .....July 1933 p. 9
(Data on natural draft and forced circulation type dryer.)

Industrial Gas..Uses of gas immersion burners in industry.....Oct. 1933 p. 21
(Beer pasteurizers, potato chip cookers.)

Industrial Gas..A small brewery improves its product .....Dec. 1933 p. 7
(Immersion heaters for cooking grain, for mash tanks and for water heating.)

Natural Gas...Gas and peanuts.....Oct. 1933 p. 30
(Continuous roasting machine improves appearance and flavor, reduces power and gas consumption over batch roasters.)

LOW-TEMPERATURE BAKING AND DRYING—I

Miscellaneous I-5

Milk Dealer...Sterilization of milk cans by a gas torch flame.....Sept. 1933 p. 50
(Inverted can on conveyor dried and sterilized in eight seconds.)

CERAMICS—J

Glass J-1

Industrial & Engineering Chemistry ...Economy and capacity of glass tanks .....Aug. 1933 p. 865
(Heat transmission with the luminous flame.)

Industrial Gas..Controlled heat for perfume atomizers .....Sept. 1933 p. 9
(Lehr for annealing and firing colors.)

Pottery J-5

Gas Journal (London) ..Gas in the pottery industry..May 3, '33 p. 277
(Use of light props instead of saggers increases kiln capacity, reduces gas consumption. High flame temperature gives rapid heat transfer.)

MANUFACTURERS' SECTION

Heating and Ventilating Show Attracts Gas Industry

WELL planned to present the newest developments in an industry which is energetic in keeping up-to-date, the Third International Heating and Ventilating Exposition will take place, February 5 to 9, inclusive, at the Grand Central Palace in New York City. Predictions that air-conditioning for homes and offices may be America's leading new recovery industry are partly responsible for the activity and interest which the exhibitors feel, and which is spreading to the thousands of visitors who are planning not only to attend the Exposition but to examine it carefully in relation to their own particular industries and interests.

A great deal of new equipment will be on display. Manufacturers who some months ago contracted for space at the Exposition have been organizing their projects to give central emphasis to the most advanced items of their line. Companies taking exhibit space shortly in advance of the Exposition, are doing so not only because of improved business conditions generally, but because the state of their own business has convinced them that special appropriations should be voted in order that their industrial story of achievement be told right now. The last Heating and Ventilating Exposition was held two years ago and the next one will not occur until 1936.

The first Exposition which took place in 1930, at Philadelphia, Pa., was attended by 57,500 visitors. The second Exposition at Cleveland, O., was even more successful than the first. Larger attendance is expected this year.

Booth No. 9 will be occupied by an exhibit sponsored by the American Gas Association, Brooklyn Borough Gas Company, The Brooklyn Union Gas Company, Consolidated Gas Company of New York, and the New York & Richmond Gas Company.

Other exhibits will be displayed by company members, including: American Gas Products Corp., American Radiator Co., Bristol Co., Bryant Heater Co., W. M. Chace Valve Co., Cleveland Heater Co., Crane Co., Fox Furnace Co., General Gas Light Co., McDonnell & Miller, Minneapolis-Honeywell Regulator Co., L. J. Mueller Furnace Co., Republic Steel Corp., Richmond Radiator Co., Watts Regulator Co., Youngstown Sheet & Tube Co.

An invitation is extended to all gas men and manufacturers to use Booth No. 9 for headquarters and a meeting place during this Exposition.

Continuous Machine for Heat Treating

THE trend in heat treating is more and more towards special gas atmospheres, whether it be clean annealing, bright annealing, carburizing, "Ni-Carb-Casing," nitriding, or heating for hardening, and as time goes on this practice will be written into specifications to a greater extent, necessitating new gas equipment for interpreting these processes.

The American Gas Furnace Company, Elizabeth, New Jersey, has announced a new continuous gas heating machine with reciprocating muffle, which is designed for such work. Any desired atmosphere can be carried in the muffle through which the work passes, thus insuring complete metallurgical control at all times.

This new machine includes a furnace construction of improved insulating refractories which absorb the minimum of heat and at the same time have high insulating properties. Automatic one-valve temperature control, without the limitations of yesterday, combines to make many inefficient industrial furnaces obsolete.

Some of the earliest work in controlled atmospheres was pioneered by the American Gas Furnace Company during the development of its rotary gas carburizing machines which have become widely accepted in industry. These batch type carburizing machines have been supplemented recently by the American "bell batch type" gas heating machine for use with various controlled atmospheres.

Electrolux Sales Soar During January

WITH January refrigerator orders over three hundred per cent higher than orders received in the same period in 1933, Electrolux Refrigerator Sales, Inc., will have the biggest January sales record in its history, it was announced January 25 by F. E. Sellman, vice-president.

Accounting for the exceptional January record, Mr. Sellman gave three reasons: First, the introduction of new models, embodying improvements in design; second, the fact that more gas utilities throughout the country are selling the company's products; and third, the better outlook for business generally throughout the country.

To further stimulate public interest in buying its products, Electrolux Refrigerator Sales, Inc., is planning a more extensive sales campaign and advertising program than any hitherto undertaken by the company, the advertising plans including greater use of newspapers and magazines than in other years, Mr. Sellman stated.

Find Gas Furnace Best for Treating Steel Tires

LOCOMOTIVE driving wheels are made of steel at the mills, with demountable steel tires. In this way the durability of the wheel is prolonged, for as fast as the tires wear out they are replaced with new ones. These tires or rims are not keyed on but are raised to a red heat, and shrunk on. If this is properly done they will never slip during service. The expansion by heating amounts to from 5/32 to 11/64 in.

Various devices and furnaces have been designed for the heating of these tires, all more or less efficient, but one of the best in use today is a gas furnace that will heat eight units at a time, and which was developed by the mechanical department of the Baltimore and Ohio Railroad. This furnace is of brick, cylindrical in shape and is built in two parts, the upper part being raised by crane for loading and unloading.

Must Pay For Gas He Stole

The operator of a large garage in Asheville, N. C., must pay the Asheville Gas Co. for several months' supply of gas, he is alleged to have taken from the lines of the company, under a ruling in police court.

After hearing testimony in the case brought by the gas company, the court assessed a sentence of six months on the roads against the garage proprietor, to be suspended on payment of costs and upon payment to the company of the estimated amount of gas taken. The charge was reduced from larceny to attempted larceny.

According to the testimony, the gas company removed the meter from the garage several months ago, and the owner opened the pipe where the meter connection had been made, inserting therein a rubber hose through which gas was supplied illegally to his garage.

NATURAL GAS DEPARTMENT

Safe Practices for Natural Gas Distribution

"Safe Practices for Natural Gas Distribution," presented herewith, is a reprint of one of a series of pamphlets covering tentative safe practices for the Gas Industry. This series has been prepared by a Joint Committee of the Technical Section and the Accident Prevention Committee of the American Gas Association. A sample of the pamphlet, together with price in quantity lots, may be had by companies that wish to consider its distribution among employees. Address Secretary, Accident Prevention Committee, American Gas Association, 420 Lexington Avenue, New York, N. Y.

ONE of the most important safety factors in construction work is the physical condition of the workmen. Particularly is this true when it is remembered that the severity rate on this type work is higher than on any other class of work in the industry. To eliminate, as far as possible, the hazards from this source, all men should successfully pass a physical examination, by a competent physician.

Next in importance to men is materials and equipment. The importance of selecting proper materials and equipment is so obvious that it hardly seems necessary to mention it. However, it has been observed that this very important factor is often neglected, especially by contractors. For this reason, we believe special emphasis should be given this matter.

Stringing Pipe

In stringing pipe, it is necessary to exercise a greater degree of skill than in ordinary truck driving, particularly so since in most instances it is necessary to pass over streets on which traffic is heavy and the hazards connected with a long coupled trailer on a truck are greater than on an ordinary truck. Trucks and trailers are designed safely to carry definite loads and should not be loaded beyond this capacity. Loads should be properly boomed, both at the front and rear bolsters. On loads the tops of which are flat, the load should be boomed from the top, but on loads, the tops of which are round or cone shaped, the booming should be done on the side. When preparing to unload, the drivers should, where possible, release the boom while standing on the ground and push the boom lever from them. By releasing the boom in this manner, the possibility of an injury from the lever kicking forward with force is prevented. In rolling the pipe from the truck, the workmen should always stand behind the end of the joint and roll the pipe from them. When unloading pipe on pavement, to prevent damage to the pipe, it should be laid on the ground instead of rolling or dropping it off the truck.

Lining Up

In lining up pipe for welding, care should be exercised to see that hands are not injured when the pipe is "driven home." The back end man should be exceedingly careful not to attempt to remove dirt or other foreign bodies from the end of joint while it is being driven home. Care must also be exercised to see that all workmen are in safe positions and properly safeguarded when a joint is being lowered. If pipe is being lined up with the aid of a tractor, workmen should also be exceedingly careful to stay out of the reach of the swinging tongs as the tractor moves forward.

Welding

Welders and welders' helpers should be provided with suitable welding goggles. If the welding is being done on a busy street, suitable shields or blinds should be provided to prevent eye injuries to observers. Standard approved equipment should be used and kept in good repair at all times. (NOTE: By consulting manufacturers of both acetylene and electric arc welding equipment, a complete set of safety rules or safe practices applicable to any particular type equipment can be obtained.)

Painting Pipe

When a cold application is being made about the only danger is that of the paint spattering and getting into the eyes. Applying a hot paint presents a different problem. There is not only the danger of paint getting in the eyes, but also the possibility of someone being painfully and dangerously burned. A good practice in this connection is to have the crew, usually consisting of two swab men and a man to do the pouring, wear goggles, gloves, boots and long rubber aprons. In the warmer sections of the country, it is advisable for the men applying a hot coating to cover their faces with cold cream or some similar preparation to prevent blistering from the fumes.

Ditching

Ditching presents a number of hazards. If the line is to be laid in alleys or off of pavements, the ditching should be done mechanically.

Where the line is to be laid under pavement, in extremely rocky soil, or over steep inclines and ravines, it is necessary to ditch by hand. With machine ditching, the greatest danger is in the machine itself. By the installation of proper mechanical safeguards over moving gears, chains and other machinery, and by providing the proper walkways or foot boards over the caterpillars and a foot board from one side of the machine to the other, this hazard can be greatly reduced. Where the ditching is to be done by hand, the men should be properly spaced to prevent the possibility of a man being injured from a fellow workman's pick. Ditches should always be properly shored or ribbed to prevent caving. The edges of the ditch should always be kept clear of loose stones or other material to prevent injuries from falling objects.

Drilling Rock and Breaking Pavement

Where it is necessary to break pavement or drill rock for blasting, paving breaker operators and rock drill operators should be required to wear goggles.

Blasting

All blasting should be done by a skilled "shooter" and only such workmen as are needed in the actual work of blasting should be permitted in the vicinity of the work. Blasting should be done by the mechanical or electric method. After the charge has been exploded, with the aid of a small galvanometer, any wire that is not entirely clear or in any way looks suspicious can be tested to determine if the charge failed to go off. If the instrument registers a circuit, the charge has failed to go off and can be reconnected to the blasting machine and fired as in the beginning.

If blasting is to be done in congested areas, heavy steel mats must be provided to prevent injury to persons and property in the immediate vicinity of the blasting.

Laying Pipe

If equipment is suitable for size pipe being handled and proper supervision is exercised, there should be very few accidents

(Continued on page 70)

TECHNICAL SECTION

Production of Vapor-Phase Gum for Pilot Tests by Continuous Addition of NO to City Gas

By J. A. Perry

The United Gas Improvement Company

EARLY in the study of the problem of vapor-phase gum in commercial gas the need for some form of an accelerated test became obvious. As the trouble caused by vapor-phase gum first made its appearance upon the adjusting needles of the regular Rutz lighters, it followed logically that such lighters might be used to measure the relative gum content of different gases; the life in days of a group of such lighters being a measure of the cleanliness of the gas from the standpoint of vapor-phase gum. Used alongside of other types of pilots or controls on the same gas, the life of such controls in terms of the life of the Rutz lighters furnished a figure of merit in comparing such new controls or pilots.

When it appeared certain that the cause of the initial formation of gum particles was the presence in the gas of very small concentrations of oxides of nitrogen and that the life of the Rutz lighters on commercial gas varied markedly with the amount of NO in the gas, a practicable accelerated test became a possibility.

The mere introduction of NO in the gas is not sufficient, however, as the mixture must be allowed to "age" a certain length of time to permit NO to form particles and for these particles to grow in size. The set-up to be described below therefore consists in general of two important elements; viz., a means for continuously adding to the gas stream a small but controllable quantity of NO and a suitable vessel where the mixture thus formed can age a predetermined length of time before it reaches the devices under test.

METHOD

A very small quantity of nitric oxide (NO) is added continuously to a stream of gas which then passes up through a galvanized-iron tower of such a volume that two hours' ageing is obtained for the formation of gum particles. A manifold is connected to the outlet of the tower and the stream of gas passes along this manifold to which the control pilots and pilots under test are connected. A modified governor bleeds gas from the extreme end of the manifold and compensates automatically for any decrease in consumption by the partially stopped pilots. In this way flow of gas through the tower (and therefore the concentration of NO and age of gas) is maintained constant.

Using Philadelphia city gas, a concentration of approximately 10 grams of NO per million cubic feet of gas appears sufficient to cause ordinary Rutz lighters to become inoperative in from 20 to 24 hours. The volume of NO required to maintain this concentration in a flow of 20 cu.ft. of gas per hour is only 0.16 cc. per hour. In order to facilitate measurement and control of such a small flow of NO, the NO is diluted (with oxygen-free nitrogen) to a concentration of 1 per cent.

APPARATUS

The sketch, Fig. No. 1, diagrams the apparatus, and the lettered details are described below.

The Main Gas Flow

A—The orifice flowmeter for gas is a No. 30 orifice in a thin disc held in a ½-inch pipe union. Pressure drop is measured by an inclined tube gauge.

B—A ¾-inch service regulator is used to maintain a constant pressure of 7.5 inches of water on the tower.

C—A ½-inch pipe cross which carries a pressure gauge and provides a place for the admission of the NO-N_2 mixture, to be described later.

D—The ageing tower, which is constructed of No. 24 gauge galvanized iron, is 12 feet 9 inches high, 24 inches in diameter, and has a volume of approximately 40 cu.ft., allowing the gas to age two hours at 20 cu.ft. per hour. Gas enters the base of the tower through a ¾-inch standard pipe to the center of the tower where there is an ell turned up. It then passes through two galvanized-iron horizontal distributing plates about 2 inches apart, with small non-registering holes punched in them, to distribute the gas evenly and so prevent turbulence and produce a streamline flow up through the tower. Similar distributors are also placed at the top of the tower in case down flow of gas is desired.

Between the outlet of the tower and the test manifold two brass stopcocks are placed, one (J) for shut-off and the other (K) for flow control.

At the outlet of the manifold a back-pressure governor (L) functions to hold a constant manifold pressure. An ordinary service regulator was modified by inverting the valve and seat so that increase of pressure on the diaphragm caused the valve to open. The device was then connected so that increase of pressure on the manifold causes the valve to open further and bleed off more gas to the atmosphere. This device functions together with the inlet governor to maintain a constant pressure drop across the flow-control cock and therefore a constant flow through this cock once the setting of cock has been made for the flow desired.

During a test, as the consumption of the regular Rutz lighters decreases due to gum deposition, the pressure on the manifold tends to increase. This causes the above described back-pressure governor to open further and bleed off gas in quantity just sufficient to balance the decrease in consumption of the lighters.

Preparation of NO-N_2 Mixture

In preparing a five-gallon bottle of NO-N_2 mixture the following procedure is used (Fig. No. 2).

Approximately 4½ gallons of tap water are placed in the bottle and saturated with NaCl and the solution then deaerated by alternately exhausting the bottle with a Cenco-Hyvac pump and refilling with N_2. After exhausting for the fourth time, the pressure in the bottle is restored by nitrogen which has been freed of any traces of oxygen. This may be accomplished by bubbling nitrogen slowly through two scrubbing bottles of chromous chloride solution. (The preparation of this solution is described in the Gas Chemists' Handbook, 3d Ed., p. 189.) The bottle is then about two-thirds filled with the purified nitrogen while the displaced salt water siphons into a lower bottle. Approximately 200 cc. of pure NO is then introduced to the bottle and the remainder of the bottle filled with the purified N_2.

The NO is prepared, as shown in Fig. No. 2, by dropping a mixture consisting of 1 part concentrated ferrous sulfate solution and 1 part concentrated hydro-

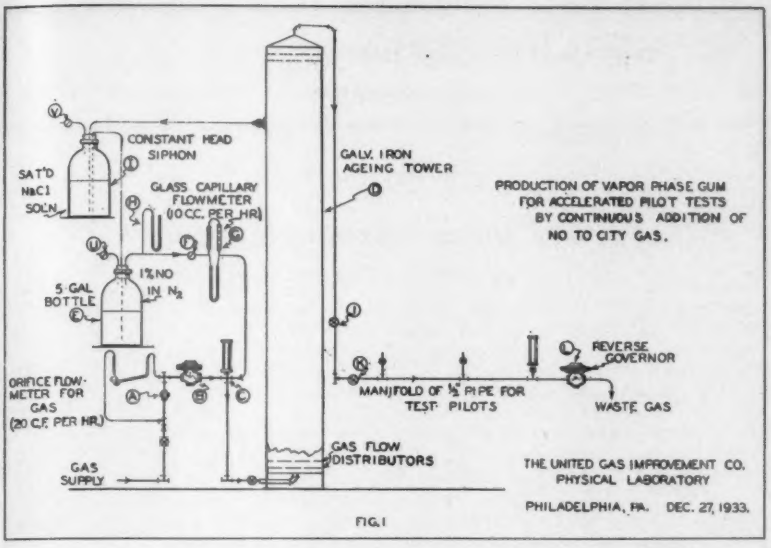


FIG. 1

chloric acid into a concentrated solution of sodium nitrite. A scrubbing bottle of 20 per cent sodium hydroxide is used to remove any NO_2 formed.

It is necessary to exercise care as described to eliminate the presence of oxygen in the water or nitrogen in order to prevent the formation of NO_2, which reacts more readily with rubber and is considerably more soluble in the salt solution than the NO. When the first batch is made up, using a new bottle and salt solution, considerable absorption and solution occur and a loss of 1 per cent or more of NO may happen, so that the initial batch should be made up to 2 or 3 per cent if a final concentration of 1 per cent is desired. The per cent NO in the mixture can be determined with an Orsat apparatus, using one pipette containing an alkaline sulfite solution for absorption of the NO. This solution contains 280 grams per liter of sodium sulfite (Na_2SO_3, $7H_2O$) and 100 grams per liter of sodium hydroxide (NaOH). The pipette used should be of the bubbling type. By using the same bottles and salt solution repeatedly for making up the mixture and by protecting the salt solution from air as much as possible, losses of NO are minimized. It has been found most convenient to keep two 5-gallon bottles permanently connected to the apparatus, as shown in Fig. No. 1, and to use two others for making up the NO-N_2 mixture as in Fig. No. 2.

The mixture is transferred to the reservoir (E) by using nitrogen pressure to force salt water into the bottle in which the mixture has been made up and displace the NO-N_2 into the reservoir through the connection U. This in turn displaces salt water from the NO reservoir (E) back up into the siphon bottle (I). V is a vent to be opened for this operation. Connections and bottle stoppers must be well wired, since several pounds' pressure is required for the operation. A mercury manometer should be connected to the first bottle from which the nitrogen is forcing salt water, so that too high pressure can be avoided.

One filling of a 5-gallon bottle with 1 per cent NO-N_2 mixture is sufficient for approximately one month's operation, when a concentration of around 10 gms. of NO per million cu.ft. and a flow of 20 cu.ft. per hour is maintained.

Measurement and Control of NO-N_2 Feed

A small-bore glass stopcock (F) controls the flow from the reservoir (E) through the glass capillary flowmeter (C). Since a pressure drop of one or two inches of water is to be obtained across this flowmeter with a flow of only a few cubic centimeters of NO-N_2 mixture per hour, the capillary for the flowmeter must be drawn out (from glass capillary tubing) to an extremely small bore. Using glass tubing of 5.5 mm. O.D. and 0.5 mm. bore, two sections 2 inches long and 4 inches apart were drawn out to double their initial length. The tubing was then bent so as to bring the two drawn out sections parallel and about 1 inch apart. Pieces of glass tubing were slipped over the drawn out capillary sections and sealed on with DeKhotinsky cement for protection in handling.

The flowmeter was calibrated with nitrogen, using a micro-burette of 10 ml. capacity, graduated in 1/50ths of a milliliter.

The capillary stopcock (F) used for controlling the small rate of flow is lubricated with pure vaseline, since stopcock greases containing rubber have a tendency to cause changes in the setting of the cock.

The NO-N_2 mixture is introduced at the ½-inch pipe cross (C). The glass tubing enters the cross through a rubber stopper and is turned to point with the gas stream.

Capillary tubing of 1 to 1½ mm. bore is used in connecting the various pieces, and, where joints are necessary, a good grade of gum rubber tubing is used. Great care is taken to insure that all tubing is clean and free from dust or powder. Although it is advisable to expose as little rubber to the NO-N_2 mixture as possible, it is convenient to have rubber connections at various points on which screw clamps can be placed in order to refill a blown manometer or clean and regrease a stopcock.

Pressure for feeding the NO-N_2 mixture into the gas stream is furnished by a constant head siphon (I), using a strong, deaerated salt solution for displacing the mixture.

A length of glass capillary tubing connecting the siphon bottle to the tower

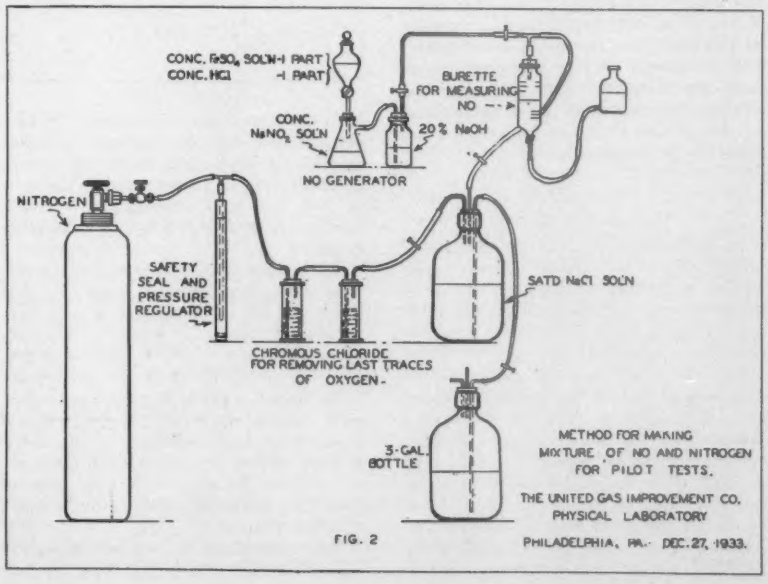


FIG. 2

acts only as an equalizer and feeds gas into the upper bottle at a point on a level with the end of the tube which siphons the salt solution out of I and into E. This device maintains the pressure at this level equal to the pressure of the gas in the ageing tower, regardless of the height of liquid above the point, and maintains a more even pressure on the bottle (E) containing the NO mixture. With the water bottle at an elevation of 44 inches above the bottle containing the NO, the pressure in the lower bottle varied from 4 inches of mercury with the upper bottle full of water to 3 inches just before the siphon broke. By allowing the water to drip into E from a capillary tip, even this change in pressure could be avoided, but this would require an extra connection so that water could be returned to the upper bottle (I) during the refilling operation. In actual operation of the test, the change of pressure in E has offered no problem, since it occurs so slowly that compensating adjustment of the control cock (F) can readily be made.

TEST PROCEDURE

In starting the test the rate of the NO-N_2 mixture is set with respect to the gas flow, so that a concentration of approximately 20 grams of NO per million cu.ft. of gas results. The effect of this concentration on the regular Rutz lighters is then noted and the NO flow readjusted, as necessary, to arrive at the concentration which will cause the lighters to become inoperative in from 20 to 24 hours.

The initial adjustment of the lighters is made by eye after sufficient observations of the proper flame height to give .25 cu.ft. per hour have been made to enable the attendant to judge the flow visually.

Only the needles of the lighters are cleaned, as it has been found that practically all of the gum deposition occurs on that part. A piece of cloth moistened with acetone is used to remove the gum from the needles. After cleaning the needles, care should be taken to see that no lint adheres to the needle points when ready to be reinserted.

REMARKS

Concentration of NO

In the laboratory, with the set-up described, where the factors such as proper ageing, proximity of lighters to source of gum, etc., are designed to produce rapid outages, Rutz lighters have become inoperative repeatedly in from 20 to 24 hours with a concentration of from 7 to 10 grams of NO per million cu.ft. However, some systems send out gas having many times this concentration of NO, yet Rutz lighters remain on for long periods. The reason for this is that the inner surfaces of the mains, meters and house piping scrub out and absorb the NO and gum. But for this action the trouble from gum in those systems would be many times what it is now. Under certain conditions these surfaces will give up NO again, but the extent of surface involved is so large compared to the mass of NO that a distribution system may continue to absorb NO for a considerable period.

The needle of the Rutz lighter is perhaps more susceptible to gum than any other gas-flow control, and it is a very suitable device with which to compare other small-flow controls, such as pilots, etc. However, where larger devices are to be tested, such as thermostatic valves, etc., concentrations of NO very much higher than those mentioned in this specification should be maintained (possibly up to 100 grams of NO per million cu.ft.) in order to obtain a satisfactory accelerated test.

Thirty-six grams of NO per million is equivalent to 1 part per million, as usually expressed in giving concentrations by the Shuftan method.

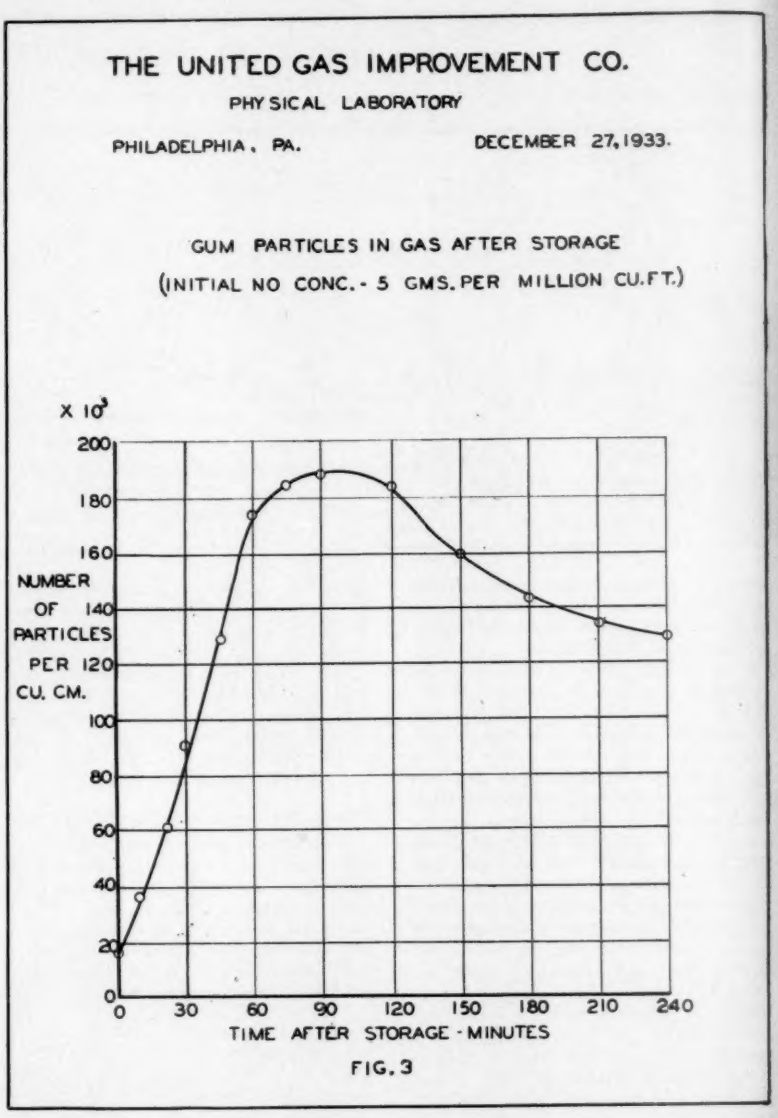


FIG. 3

Ageing the Gas

When NO is added to the gas and the mixture allowed to age, the observed gum count increases to some maximum and then decreases, but at a slower rate. Steps involved in this process are (1) formation of particles, (2) coalescence or aggregation, and (3) settling. At the start of the ageing period formation predominates and the count increases rapidly. After sufficient particles have formed, aggregation starts and formation proceeds at a slower rate due to depletion of NO. At the time of observing the maximum count, formation has slowed down appreciably and aggregation is probably taking place at the maximum rate. As a result, the particles are increasing in size at such

(Continued on page 70)

TESTING LABORATORY

F. O. Suffron Heads Research Department at Cleveland

F. O. Suffron

THE Testing Laboratory has announced the appointment of F. O. Suffron as head of the research department to fill the vacancy created by the resignation of W. M. Couzens.

Mr. Suffron has had twenty years' experience in the field of engineering, the majority of which time he spent in the gas industry. He graduated in civil engineering from Oregon State College, in 1915. From 1916 to 1920 he was employed as engineer of tests for Smith, Emery & Company, consulting engineers and chemists, San Francisco, California. His experience with this company, which involved extensive investigations and tests of materials of construction and manufacturing processes, should be of particular value to him in his new position. For the succeeding nine years Mr. Suffron was associated with The Portland Gas and Coke Company, Portland, Oregon, as an engineer in the Distribution Department. During 1930 and the early part of 1931 he held the position of Gas Distribution Engineer with the Washington Gas and Electric Company, from which position he resigned to join the Testing Laboratory.

During the past three years Mr. Suffron has been engaged largely in research at the Laboratory. The investigation of pipe joints, including the completion of the work on bell and spigot joints and mechanical joints, together with the development of the weld test indicator, was under his supervision in 1931 and 1932. A large part of his time during the past year was devoted to requirements research activities. His familiarity with the Laboratory's various research activities enables him to carry on the work of this department without interruption.

New Requirements Available

FIVE additional approval and listing codes recently were approved as American Standards and published in final form. These include:

American Standard Approval Requirements for Gas Ranges, Effective June 1, 1934 .....Z21.1 —1933

American Standard Approval Requirements for Hot Plates and Laundry Stoves, Effective June 1, 1934..Z21.9 —1933

American Standard Approval Requirements for Gas Water Heaters, Effective July 1, 1934.....Z21.10—1933

American Standard Approval Requirements for Gas Space Heaters, Effective July 1, 1934.....Z21.11—1933

American Standard Listing Requirements for Draft Hoods, Effective July 1, 1934 .....Z21.12—1933

Copies of these standards may be secured upon application to the Testing Laboratory, 1032 East 62nd Street, Cleveland, Ohio.

Manufacturers may now have their draft hoods tested for listing in accordance with the above code, or their appliances tested under the revised approval requirements, upon application to the Testing Laboratory.

The following additional specifications were completed at the November meeting of the A. S. A. Sectional Committee, Project Z21, A. G. A. Approval Requirements Committee, for submission to the American Standards Association for approval as American Standards:

Approval Requirements for Central Heating Gas Appliances, Effective January 1, 1935....(Revised)

Approval Requirements for Industrial Gas Boilers, Effective January 1, 1935.....(New)

Approval Requirements for Unit Heaters, Effective January 1, 1935 .....(New)

Listing Requirements for Gas Burner Valves, Effective January 1, 1935.....(New)

Copies of these codes soon will be available in printed form. The Laboratory is now in position to test equipment in accordance with these requirements.

Requirements for Appliance Accessories

A MEETING of the Subcommittee on Listing Requirements for Gas, Pressure, and Temperature Control Accessories, to consider criticisms from the industry and to complete the final draft of these requirements, was scheduled to be held at the Laboratory, late last month.

Codes under consideration by this committee include the following:

1. Listing Requirements for Domestic Gas Appliance Pressure Regulators,
2. Listing Requirements for Water Heater, Gas Range, and Space Heater Thermostats,
3. Listing Requirements for Pressure, Temperature, and Vacuum Relief, and Automatic Gas Shut-Off Valves,
4. Listing Requirements for Diaphragm Gas Valves,
5. Listing Requirements for Electric Gas-Control Valves.

Water Heater Requirements Extensively Revised

THE most extensive revisions in, and additions to, the Approval Requirements for Gas Water Heaters that have been made since the adoption of the original code were passed by the Subcommittee at its December meeting. These changes apply to the American Standard Approval Requirements for Gas Water Heaters (Effective July 1, 1934), and although they will not be completed and become effective until some time in 1935 attention is called to them at this time as the proposed revisions soon will be distributed to the industry for criticism. Among the more important changes are the following:

(1) An increase in the minimum allowable thermal efficiency for all types of heaters; (2) addition of requirement making mandatory the use of means of relief for excessive temperatures and pressures, and (3) correlation of the construction and performance specifications for thermostats, gas valves, automatic relief and shut-off valves, and draft hoods contained in the water heater requirements, with the listing requirements for such accessories.

New Member

ROSS Industries Corporation, New Brunswick, New Jersey, manufacturers of unit heaters, has joined the Association as a manufacturer company member. R. Sadwith, vice-president, is the company delegate.

Monthly Summary of Gas Company Statistics

FOR MONTH OF NOVEMBER, 1933

Issued January, 1934, by the Statistical Department of the American Gas Association
420 Lexington Avenue, New York, N. Y.

PAUL RYAN, Statistician

COMPARATIVE DATA ON THE MANUFACTURED AND NATURAL GAS INDUSTRY FOR THE MONTH OF NOVEMBER

	Month of November			Eleven Months Ending November 30		
	1933	1932	Per cent Change	1933	1932	Per cent Change
Customers						
Domestic (Including House Heating)	14,499,600	14,565,300	— 0.5			
Industrial and Commercial	954,400	958,300	— 0.4	*See November*		
Total	15,454,000	15,523,600	— 0.4			
Revenue (Dollars)						
Domestic (Including House Heating)	40,782,000	42,517,300	— 4.1	447,352,000	481,536,800	— 7.1
Industrial and Commercial	16,849,300	16,412,200	+ 2.7	170,581,800	175,183,000	— 2.6
Total	57,631,300	58,929,500	— 2.2	617,933,800	656,719,800	— 5.9

COMPARATIVE DATA ON THE MANUFACTURED GAS INDUSTRY FOR THE MONTH OF NOVEMBER

Customers						
Domestic	9,375,300	9,483,600	— 1.1			
House Heating	80,400	61,600	+30.5			
Industrial and Commercial	481,100	484,200	— 0.6	*See November*		
Miscellaneous	8,300	8,100	—			
Total	9,945,100	10,037,500	— 0.9			
Gas Sales (MCF)						
Domestic	20,469,000	21,338,300	— 4.1	227,278,100	245,640,300	— 7.5
House Heating	2,924,600	2,029,800	+44.1	19,102,500	18,396,200	+ 3.8
Industrial and Commercial	7,030,700	6,631,700	+ 6.0	74,386,400	74,533,500	— 0.2
Miscellaneous	178,300	186,300	—	1,695,800	1,814,300	—
Total	30,602,600	30,186,100	+ 1.4	322,462,800	340,384,300	— 5.3
Revenue (Dollars)						
Domestic	24,367,000	25,595,600	— 4.8	271,566,400	296,249,900	— 8.3
House Heating	1,746,400	1,457,600	+19.8	12,918,400	13,752,300	— 6.1
Industrial and Commercial	5,705,100	5,845,000	— 2.4	61,355,300	66,349,800	— 7.5
Miscellaneous	109,700	124,200	—	1,195,500	1,264,200	—
Total	31,928,200	33,022,400	— 3.3	347,035,600	377,616,200	— 8.1

COMPARATIVE DATA ON THE NATURAL GAS INDUSTRY FOR THE MONTH OF NOVEMBER

Customers						
Domestic (Including House Heating)	5,043,900	5,020,100	+ 0.5			
Commercial	443,100	443,900	— 0.2			
Industrial	15,700	15,900	— 1.3			
Main Line Industrial	4,500	4,600	— 2.2	*See November*		
Miscellaneous	1,700	1,600	—			
Total	5,508,900	5,486,100	+ 0.4			
Gas Sales (MCF)						
Domestic (Including House Heating)	20,398,600	21,624,700	— 5.7	229,077,400	241,319,000	— 5.1
Commercial	7,392,200	8,099,500	— 8.7	74,842,000	76,513,600	— 2.2
Industrial	35,305,600	31,268,000	+12.9	330,666,700	314,820,200	+ 5.0
Main Line Industrial	14,121,300	11,190,500	+26.2	117,237,700	99,815,300	+17.5
Miscellaneous	851,500	1,097,000	—	8,374,400	8,711,100	—
Total	78,069,200	73,279,700	+ 6.5	760,198,200	741,179,200	+ 2.6
Revenue (Dollars)						
Domestic (Including House Heating)	14,668,600	15,464,100	— 5.1	162,867,200	171,534,600	— 5.1
Commercial	3,182,500	3,447,500	— 7.7	34,111,000	35,581,200	— 4.1
Industrial	6,200,100	5,554,500	+11.6	60,106,800	59,212,000	+ 1.5
Main Line Industrial	1,463,900	1,242,500	+17.8	12,417,700	11,432,600	+ 8.6
Miscellaneous	188,000	198,500	—	1,395,500	1,343,200	—
Total	25,703,100	25,907,100	— 0.8	270,898,200	279,103,600	— 2.9

Gas Sales Increase 5 Per Cent During November

SALES of manufactured and natural gas aggregated 108,671,800,000 cu.ft. in November, an increase of 5 per cent over the corresponding month of the preceding year.

In spite of augmented sales, however, revenues continued to lag, income for November amounting to $57,631,300 as compared with $58,929,500 in November a year ago, a decline of 2.2 per cent.

Most of the sales expansion of the industry was the result of pronounced increases in gas sales for industrial-commercial purposes, which averaged 11 per cent above the figures for November a year ago. Revenues from this class of business also gained, although not in proportion to increased volume, amounting to $16,849,300 in November as compared with $16,412,200 for the same month of the preceding year, an increase of 2.7 per cent.

While sales of manufactured gas for domestic cooking, water heating, refrigeration, etc., continued to run about 4 per cent below a year ago, sales for house heating purposes registered a sharp gain, amounting to more than 44 per cent over the preceding year. Manufactured gas sales for industrial-commercial uses were also above those of a year ago by 6 per cent.

Natural gas sales for domestic uses during November were nearly 6 per cent below those of a year ago. Sales to ordinary industrial customers, however, were up nearly 13 per cent, while sales to large scale industrial users of natural gas showed a gain of more than 26 per cent over the same month of the preceding year.

"Discovers" Gas When He Drives Post

Russell Mayden, a farmer living between Carrollton and Norborne, Mo., recently had an unusual experience. Mayden was driving an iron post into the ground according to "Gas Service" published by The Gas Service Company, Kansas City, Mo., and thought that he had struck gas. However, the gas was coming from the main line of the Cities Service Company running between Carrollton and Norborne.

While driving the post into the soil it seemed to contact a hard object. Unable to send the post deeper with the same force the farmer was advised by an assistant to hit and hit hard. Coming down with all force possible slight headway was made but soon the fumes of gas poured out of the opening. "We've struck gas," the suprised farmer shouted, and on investigation his statement was verified. The sharp end of the post had penetrated the Cities Service Company's gas line.

Frank L. Dame Passes Away at New York Home

FRANK LIBBY DAME, president and chairman of the board of the North American Company and a leading public utilities executive, died December 30 at his home in Garden City, L. I., N. Y. He was sixty-six years old.

Mr. Dame was born in Boston, Mass., a descendant of early New England settlers, and was graduated from the Massachusetts Institute of Technology in electrical engineering. Early in his career, Mr. Dame served as engineer in various electric and railway properties throughout the country, later becoming equally successful in the management of public utilities.

He was president of the Electric Bond & Share Company from 1909 to 1912 when he resigned to take the presidency of the Central States Electric Corporation. In 1920, he became vice-president of the North American Company and six months later, in 1921, was elected president. Mr. Dame was a member of several prominent clubs and was a trustee of the Edison Electric Institute.

Succeeds Mr. Dame

JAMES F. FOGARTY was elected president of the North American Company at a special meeting of the board of directors, January 4, to succeed the late Frank L. Dame. Mr. Fogarty has been with the company thirty-one years, and for the last eleven years has been a vice-president. He is also a director and a member of the executive committee.

David R. Hawkins of the law firm of Sullivan & Cromwell, general counsel for the company, was elected yesterday a director to succeed Mr. Dame.

Mr. Fogarty was born in Philadelphia on March 16, 1888. He entered the utility industry in 1902 as a stenographer for the North American Company, and by successive advances became assistant secretary in 1910, secretary in 1912, a director in 1914, vice-president in 1923 and president last month.

Clare N. Stannard Dies; Doherty Organization Leader

C. N. STANNARD, vice-president and general manager of the Public Service Company of Colorado and one of the most prominent executives in the Henry L. Doherty organization, died in Denver, Colo., January 3.

Clare N. Stannard

Born in Friendship, N. Y., Mr. Stannard received his education at Binghamton, N. Y., where he began his career in the employ of the Susquehanna Valley Bank as messenger and bookkeeper. From 1890 to 1896 he was employed by the Binghamton Gas & Electric Company, during which time he acquired a thorough knowledge of gas and electric engineering through technical training in the gas and electric departments. In 1897, he moved to Denver, and obtained employment with the Denver Consolidated Electric Company where he won steady advancement to the post he held at the time of his death.

One of the outstanding accomplishments in the gas industry, brought about under his direction, was the first adoption of selective standards. Mr. Stannard for many years took an active part in association affairs, having been a member of the American Gas Institute, the Pacific Coast Gas Association and the American Gas Association. He also served as president of the National Commercial Gas Association in 1911, and in recent years held high office in numerous civic organizations.

H. L. Farrar Is Elected Coast Counties Head

H. L. FARRAR was elected president of the Coast Counties Gas and Electric Company, Santa Cruz, Calif., at a meeting of the directors, on January 5, in San Francisco. He succeeds J. B. Wilson, resigned, who will assume new duties in the Middle West.

In addition to his election as president of Coast Counties Gas and Electric Company, Mr. Farrar was appointed general manager of the Coast Counties Gas and Electric Company, the Natural Gas Corporation of California and West Side Natural Gas Company.

Mr. Farrar went to the Pacific Coast in 1931 to join the staff of the Standard Management and Operating Corporation. Preceding this he was with the Western United Gas and Electric Company.

Alter Specifications for Cast Iron Line Drips

THE following suggestion with respect to a change in the standard for cast iron line drips was received by Chairman C. C. Simpson, Jr., of the Cast Iron Pipe Subcommittee:

"Cast iron line drips are cast with a boss on the inside of the bottom, 4" in diameter and ½" raised above the bottom of the drip.

"We have encountered trouble with the larger size drips with cracks in the bottom and it has been necessary to reject several castings on this account. Other cracks have been discovered after being in service, which, of course, is most annoying and troublesome. We have consulted the foundrymen and they say that it is possible that the boss is responsible for this cracking due to unequal cooling after casting. We believe that the boss performs no useful function and should be eliminated.

"We suggest that your Committee on Cast Iron Pipe Standards change the American Gas Association specifications accordingly."

The matter was considered by the Subcommittee on Cast Iron Pipe Standards and it was unanimously agreed that the "boss" referred to appeared to serve no useful purpose and could readily be omitted. It is proposed to have any necessary discussion of this change in the Standard Specifications at the coming Distribution Conference to be held in Detroit, Mich., April 9 and 10.

Safe Practices for Natural Gas

(Continued from page 63)

from lowering in or laying pipe. Proper and sufficient skids should be provided. The skids should be made of oak or extremely hard wood, as pine and other soft or semi-soft woods will not stand the sudden strain to which the skids are subjected, especially when handling large diameter pipe. Men must not be permitted to work in a ditch under suspended pipe.

Repairs to Natural Gas Distribution Lines

After the bar gang has located the leaks, the most hazardous work is making repairs. Every precaution should be taken to prevent a fire or an explosion or asphyxiation. If the leak is one which can be repaired with a split sleeve or saddle, there is not a great deal of danger from fire or explosion if smoking and open flames are forbidden, in the vicinity of the gas. If, however, it is necessary to remove a joint or a section of a joint, additional precaution must be taken. Where the lines are welded, it will occasionally become necessary to cut out sections of pipe. The old method of cutting out bad pipe was with a cold cutter and sledge hammer. This operation presents two hazards; danger of injury to the eyes and face from flying pieces of steel, and of fire and explosion. Another method is to make the cut with a cutting torch. This method is also very dangerous, as there is the ever present danger of fire and explosion. The safe way of making the cut is with a modern wheel type cutter. A cutter has been designed which is collapsible and can be set upon the pipe in the ditch and the cut made in a very few minutes. This cutter is so designed that the wheel cutters are automatically fed in the pipe by the motion of the ratchet bar. With this type cutter, there is little or no friction and the danger of fire and explosion is practically eliminated.

In the event it should become necessary to remove a joint of pipe, a vent pipe should be provided and installed at each end of the exposed joint in order to vent gas which is escaping or leaking by the block gates, while the ditch is being cleaned out and preparations are being made for the installation of the joint. The vent should extend at least eight feet above the surface of the ground, orifice to be covered by 40 mesh screen.

When work is done in roadways and streets, ample guards should be provided to protect the workmen, as well as the public.

Production of Vapor-Phase Gum

(Continued from page 66)

a rate that settling starts, and the particle count decreases, rapidly at first and then more and more slowly.

With gas containing approximately 3 grams of NO per million cu.ft., a maximum gum content was reached in 2 hours. At a concentration of NO between 5 and 10 grams per million, the maximum count occurred after approximately 1½ hours. With a very high (but unknown) concentration, a maximum count of a million gum particles per cubic centimeter was obtained 20 minutes after adding the NO. The attached curve sheet (Fig. No. 3) shows the variation of the particle count with time after storing gas containing approximately 5 grains of NO per million cu.ft.

On the basis of these observations the ageing tower was built of such a size that, after addition of the NO, one to two hours' ageing can be obtained by varying the gas rate.

All of the work described was done with a city gas containing approximately 10 per cent coal gas, 20 per cent coke-oven gas and 70 per cent carburetted water gas. Gases differing considerably from this composition may be expected to offer some differences in behavior with NO, and some experimentation may be required to determine the proper operating conditions.

Distribution Conference

(Continued from page 58)

Gas Company; and a paper on consolidation of shops by H. B. Andersen, Philadelphia Gas Works Company.

An innovation on the program will be a paper by Miss Hulda Ungericht, home service director of the Ohio Fuel Gas Co., Columbus, Ohio, on "Satisfying the Customer." While the keynote of the program is economy, the distribution engineer appreciates that this must be accomplished without sacrifice of service, and undoubtedly Miss Ungericht will have many interesting comments to make along these lines.

A paper of distinct interest to natural gas distribution engineers will be presented by Chester L. May, vice-president of the Community Natural Gas Company, Dallas, Texas, on "Organization and Operation of Numerous Distributing Systems Scattered over Wide Areas."

Contributions already arranged for clearly indicate that the Conference will hold a broad interest for all engineers, and a very satisfactory attendance is indicated.

Don't forget the place and date—The Book-Cadillac Hotel, Detroit, Michigan, April 9 and 10, 1934. A tentative program of the Conference will be published in the MONTHLY.

PERSONNEL SERVICE RECEIVES TWO LETTERS

Two letters were received in the same mail from employer-advertisers, one a manufacturer of gas utilization equipment in the Middle West and the other a holding company with Eastern headquarters. Extracts from the former, 0265, dated January 15th, follow:

"Thanks very much for your letter of January 11 and also the statement as to qualifications of Mr._____. We are very glad to receive this information. * * * Your service is greatly appreciated and we hope that you will continue to keep your eyes open for possible representatives * * * especially desirous of securing connections in the Southeast and far Southwest."

Following examination of confidential classification records, placement of an advertisement and interviews, the other advertiser, 0264, wrote, January 16th:

"I am returning herewith the entire correspondence and applications in reference to the vacancy which we filled with Mr._____. We certainly appreciate all the trouble you have gone to and wish to thank you for your very kind assistance."

Associations Affiliated with A. G. A.

Canadian Gas Association
Pres.—Donald G. Munroe, Montreal Coke & Mfg. Co., Montreal, Que.
Sec.-Tr.—G. W. Allen, 21 Astley Avenue, Toronto.

Empire State Gas and Electric Association
Pres.—Alfred H. Schoellkopf, Niagara Hudson Power Corp., Buffalo, N. Y.
Chairman, Gas Section—A. M. Beebee, Rochester Gas & Electric Corp., Rochester, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.

Illinois Public Utilities Association
Pres.—Bernard J. Mullaney, The Peoples Gas Light & Coke Company, Chicago, Ill.
Sec.—J. R. Blackhall, Suite 1213, 79 West Monroe St., Chicago, Ill.

Indiana Gas Association
Pres.—R. S. Brunner, Indiana Gas Utilities Co., Richmond, Ind.
Sec.-Tr.—P. A. McLeod, New Castle, Ind.

Michigan Gas Association
Pres.—Walter E. White, Commonwealth & Southern Corp., Jackson, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.

Maryland Utilities Association
Pres.—F. A. Mitchell, Eastern Shore Public Service Co., Salisbury, Md.
Sec.—D. E. Kinnear, 803 Court Square Bldg., Baltimore, Md.

Mid-West Gas Association
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Missouri Association of Public Utilities
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Mgr.—E. F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.

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Pres.—R. G. Walter, Wisconsin Power & Light Co., Madison, Wis.
Exec. Sec.—J. N. Cadby, 135 West Wells St., Milwaukee, Wis.

Personnel Service

SERVICES OFFERED

Air conditioning. Graduate mechanical engineer 1932 desires position in air conditioning or heating field. Two years' experience in air conditioning, heating and ventilating in office and field. Has done some research work on Silica Gel Air Conditioning Systems. Will go anywhere. Salary secondary. **800.**

Reduced income of gas companies requires better and more intelligent plant control to help maintain dividends. Experienced **gas engineer** can bring to your organization or company that technical and practicable aid necessary to further reduce operating expenses to a minimum. **802.**

Executive, **salesman,** stoves, furnaces, boilers and radiation. Over twenty-five years' experience, all general office details—credits, collections, sales promotion, sales customers claims and traffic. Wide acquaintance among furniture, hardware and department store trade in Northern Ohio and Michigan. Also conducted warm air heating business on own account for several years. **803.**

Young engineering graduate with varied experience in design, manufacture, erection and operation of gas plant equipment, practical specialist in modern methods of **water gas** production engaged as supervisor of operation in plant of large city, desires similar employment in smaller community. Salary secondary. Married. **804.**

Technical graduate, 1931, **single,** specialized in gas and chemical engineering, with experience in several industrial concerns, also in testing **house heating** equipment; interested in development and experimental work, willing to go anywhere and to consider any position regardless of salary. **805.**

Gas engineer and manager, University graduate (45). Twenty-two years' experience in executive positions, including coal, oven and water gas, natural gas, high and low pressure distribution. **807.**

Gas engineer (34) technical graduate, several years broad experience with affiliated holding and operating companies in high and low pressure distribution, coal and water gas manufacture, natural and refinery gas, design and installation of distribution and transmission systems; specialist with excellent record of results in mitigation of unaccounted-for gas. **808.**

Young man with nine years' experience in **sales** and **engineering** work; seven years with one of the largest oil burner manufacturers, as assistant equipment manager and two years with manufacturer of gas industrial furnaces as an erection engineer. College graduate (M.E.). **809.**

Executive **printer** with exceptional knowledge of every phase of the business. Thoroughly familiar with all forms of advertising, commercial printing and lithography. Capable of planning to procure your requirements most economically. Employing this man does not involve any expense as his remuneration would be offset many times by savings effected. **810.**

Manager. Thoroughly experienced in gas, natural gas and electric operation. Excellent record in New Business and in handling difficult properties. **812.**

Public relations (35). Thoroughly experienced in all phases of sales promotion, advertising and publicity; advertising agency training. Fourteen years' record available with highest credentials. U. S. government recognition for planning and advertising; available immediately. **813.**

Executive and **sales** position. Thoroughly experienced gas utilization engineer, industrial house heating and domestic, nine years' experience in new business operations. **815.**

SERVICES OFFERED

Controller, executive assistant, **general accountant,** charge of finances; twenty years' experience general and cost accounting; preparation and administration of budget; control of departmental operations; interim and annual statements; charts, graphs; supervision accounting department, personnel, correspondence, collections, adjustments; office management; purchasing; unemployment due to liquidation of firm; salary moderate; (46) married. **816.**

Market analyst (33) has recently completed supervision of house heating survey for gas company in large mid-western city, while employed by well-known concern of marketing counsellors. A highly successful campaign was executed and domestic sales increased sharply on basis of house heating study. Background includes practical engineering and marketing experience in other basic industries. **817.**

As **superintendent** or **manager** of gas property by man having a number of years' experience in all branches of the gas business. Capable of taking charge of any plant, either coal, water or natural gas. **818.**

Executive **manager,** University man. Eighteen years' experience in the industry. Experience covers all phases of the business on coal, water and coke oven gas operations. Particularly successful with sales development on coke, house heating and refrigeration. Excellent public relations and employee personal record. Married. **819.**

Budget director; executive, engineering training, fifteen years' experience management gas and electric companies, qualified supervise preparation, operation, control of budgets. Practical background all branches gas and electric industry, understanding financial requirements, able to secure coordinated perspective for construction, operating and financial budgets. Can analyze costs, prepare explanatory reports on actual operations. **820.**

Utilities **accountant-engineer;** twelve years' experience, uniform system of accounts, original cost valuation of land, structures and equipment in operating property, fixed capital analyses and records, depreciation and retirement reserve, financial and operating reports, cost accounting, rate investigations; graduate engineer (39). **822.**

Distribution engineer, technical graduate, married, six years' experience with manufactured and natural gas. Can survey, design, make extensions or modernize low and high pressure systems. A practical **operator,** can handle men, utilization problems, and installation of appliances. Position wanted as **superintendent** or staff assistant. **823.**

Manufacturer's representative. Particularly desirous of carrying complete line of automatic gas-fired water heaters and tank heaters. Well known among gas companies, plumbing supply jobbers, plumbers and architects in New York City, Westchester County and Long Island, and has excellent contacts, having covered this trade for the past fourteen years. **824.**

Air conditioning specialist (35) married. Technical education; five years' successful sales record with world's largest manufacturer. Background of seven years' experience in gas industry as supervisor of industrial, commercial and house heating sales. Invites investigation and consideration of far-sighted gas executives desirous of promoting residential air conditioning sales. **825.**

Combustion engineer with ten years' experience in plant fuel economy desires connection with utility or industrial concern. A thorough knowledge of and practice in fuel application to industrial operations. Six months foreign consulting. Chief consideration to effect fuel economy. Salary secondary to opportune connection. **826.**

SERVICES OFFERED

Manufacturer's distributor: Gas ranges and appliances; New York and Eastern territory. Wide experience in sales, sales administration and manufacturing plus valuable contacts among utilities, leading department, furniture and house furnishing stores, stove jobbers and dealers, coupled with successful record, is advertisers' background. Strictly commission basis. **827.**

Noise reduction and elimination of vibration are special problems for mechanical engineers. For the past two years I have been specializing in this work. Back of this lies eighteen years' practical engineering experience divided between gas and steel industries since graduating from Cornell University. **828.**

Sales-gas engineer desires utility operating connection or as manufacturers' sales representative; graduate engineer, twenty years' diversified experience, familiar with design, construction and operation of all gas equipment including holders from drafting board to erection; knows their maintenance and operation thoroughly. Exceptional sales record and unusually fine contacts. **829.**

Executive—Not "Jack-of-all-trades"—but one having thorough training, broad experience as Secretary, Treasurer, General Manager, Sales-Advertising-Publicity Manager, Security Sales Director, Cost Analyst, Rate-Valuation Engineer, Industrial Power-Gas Engineer, and otherwise highly developed all phases public utility work; successful record; invaluable contacts. **830.**

Gas engineer with manufactured or natural gas company or gas consulting engineering firm. Wide experience in production and distribution work also design and construction of natural gas distribution systems. Some experience in valuation work and securing of franchises. Married (35); willing to go anywhere. **831.**

Sales supervisor, new-business man, buyer, desires position. Broad education. Understands public, dealer relations. Thorough knowledge domestic appliances, home service, gas cooking schools, range style shows. Original ideas for meeting electric competition, holding old, obtaining new business. Proven ability to operate with minimum stocks, get frequent turnover and increase sendout. **832.**

Operating manager—engineering graduate with consulting and operating experience in natural and manufactured gas; production, transmission and distribution. Age 42, married. Familiar with accounting and experienced in financing. Recently had complete executive responsibility for operating group of natural gas properties. Immediately available. **833.**

POSITIONS OPEN

Gas appliance **salesmen** wanted. Those having utility sales experience preferred. We have an attractive proposition for men who can show a clean, successful record. Our product is outstanding in its field. Straight commission. No drawing account. Contracts for 1934 now being made. Desirable openings available in eastern and southern states. **0265.**

Gas appliance salesmen, with utility sales experience preferred and with sound knowledge of gas combustion. State in confidence, your age; sales experience; length of employment with former employers; products sold; chief territory covered, and upon what basis of remuneration. Our product is well known and advertised. Have desirable openings for result-getters upon drawing account against commission basis. **0266.**

Foreman or **engineer** wanted for Roumania, expert in erecting and running natural gas channel black plant. Applicants should have had several years' practical experience; please give record and state salary expected. **0267.**

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